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THE UNIVERSITY OF ALBERTA

CHRONIC LOW BACK PAIN
AND
COGNITIVE-BEHAVIORAL THERAPY

BY

ABRAHAM RAMI SELA

A THESIS

SUBMITTED TO THE FACULTY OF GRADUATE STUDIES AND RESEARCH IN PARTIAL FULFILMENT OF THE REQUIREMENTS FOR THE DEGREE OF DOCTOR OF PHILOSOPHY

IN

COUNSELLING PSYCHOLOGY

DEPARTMENT OF EDUCATIONAL PSYCHOLOGY

EDMONTON, ALBERTA

SPRING 1990

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The undersigned certify that they have read, and recommend to the Faculty of Graduate Studies and Research for acceptance, a thesis entitled CHRONIC LOW BACK PAIN AND COGNITIVE-BEHAVIORAL THERAPY submitted by ABRAHAM RAMI SELA in partial fulfilment of the requirements for the degree of DOCTOR OF PHILOSOPHY in COUNSELLING PSYCHOLOGY.

.....
Supervisor

.....

.....

.....

.....

Date: November 21, 1989

DEDICATION

This work is dedicated to my wife

Yudith Sela

It was mainly her endurance and unconditional support

which made this happen.

ABSTRACT

This study was designed (1) to compare chronic low back pain (CLBP) patients to No-Pain subjects in order to discern differences in pain suffering, self-generated coping strategies, perceived health locus of control, and levels of emotional distress; and (2) to evaluate the efficacy of cognitive-behavioral therapy in attenuating chronic low back pain and in improving CLBP patients' coping ability and sense of well-being.

One hundred No-Pain subjects and forty CLBP patients participated in the study. All participants completed a battery of five questionnaires (background information, McGill Pain Questionnaire, Coping Strategies Questionnaire, Multidimensional Health Locus of Control Questionnaire, and Basic Personality Inventory). Eighteen of the CLBP patients underwent cognitive-behavioral therapy which consisted of six group sessions.

Results show that CLBP patients not only reported a higher intensity of pain but they also showed a pronounced tendency to catastrophize as their main response to pain, unlike the No-Pain subjects who were reportedly more inclined to apply coping self statements under pain conditions. The CLBP patients appeared also to subscribe to chance locus of control beliefs, in contrast to the No-Pain subjects who were more apt to express internal locus of control beliefs and stronger confidence in their ability to master and reduce pain. Results indicate that CLBP patients manifest significantly greater levels of emotional distress than non-pain subjects as was evident in their elevated scores in measures of hypochondriasis, depression, denial, anxiety, social introversion, self depreciation, and deviation.

CLBP patients who participated in the treatment program had a significant reduction on measures of pain intensity; they reported greater utilization of more adaptive coping strategies such as diverting attention, reinterpreting and ignoring pain sensations, more reliance on coping self statements to the detriment of catastrophizing, and a resurgence of confidence in their ability to control and affect their pain. Post-treatment patients also indicated an increase in their internal health locus of control beliefs, a decrease in their chance health locus of control beliefs, and lessening levels of depression, anxiety, social introversion, and self depreciation. The CLBP patients expressed a high level of satisfaction with the relevance and usefulness of the treatment program.

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I. INTRODUCTION

> Let it not come unto you, all ye that pass by!
> Behold, and see
> If there be any pain like unto
> My pain,
> Which is done unto me
> Wherewith the Lord hath
> Afflicted me
> In the day of His fierce anger. (Lamentations 1:12)

A. Chronic Pain

Chronic pain is a complex phenomenon which affects 11% of the population (Crook, Rideout, & Browne, 1984). Bonica (1985) estimates that 700 million work days are lost every year due to chronic pain and that the total cost of related health care in the United States, excluding cost of human suffering, approximates $60 billion annually. Chronic pain is laden with emotional, behavioral, and sensory components which make it one of the most difficult conditions to treat. According to Melzack and Wall,

> Chronic pain is one of the most challenging problems in medicine and biology. It is a challenge to the sufferer who must often learn to live with pain for which no therapy has been found. It is a challenge to the physician or other health professional who seeks every possible means to help the suffering patient. It is a challenge to the scientist who tries to understand the biological mechanisms that can cause such terrible suffering. It is also a challenge to society which must find the medical, scientific and financial resources to relieve or prevent pain and suffering as much as possible. (1982, p. 9)

Feuerstein, Labbe, and Kuczmierczyk (1986) observe that only a few individuals are able to accept and cope with chronic or recurrent pain such as arthritis, migraine headache, and back pain and maintain a high functioning level. The majority of chronic pain sufferers, however, develop a complex cluster of symp-

toms including personal, functional, and social difficulties independent of their type of pathophysiology.

B. Chronic Low Back Pain (CLBP)

The Symptom

Chronic low back pain (CLBP) is one of the most common chronic pain symptoms (Schmidt & Arntz, 1987). CLBP is a persistent unpleasant or noxious sensation of varying severity (ranging from mildly annoying to excruciating) with a severely debilitating prognosis in both physical and psychological terms (Turk & Flor, 1984). It is often regarded as benign refractory pain with unknown origin, cause, and etiology (Loeser, 1982).

The term CLBP is commonly used to refer to a low back pain which has lasted for more than six months and whose assumed origin is in the spine or the surrounding tissue and not due to a specific disease process (Cailliet, 1981). A range of diagnostic terms are associated with chronic low back pain: lumbar-sacral strain, lumbar disc disease, sciatica, lumbago, spinal stenosis, fibrosis, and degenerative disc disease (Cailliet, 1981; Finneson, 1980; Wood & Badley, 1980). Chronic low back pain is also increasingly viewed as a psychophysiological and psychosocial disorder coupled with emotional maladjustment and cognitive-behavioral dysfunction.

Magnitude of the Problem

CLBP is an important health and economic problem which plagues a large segment of the population. According to United States Vital and Health Statistics (1974), it is the third leading cause of physical limitation and disability in the U.S.A.; 3.9% of the population is permanently disabled by it, and 80% of all adults are afflicted by at least one episode of severe low back pain (Flor & Turk, 1984)

which potentially can evolve into chronic low back pain. While acute back pain is usually a self-limiting condition, receding even without medical intervention (Dixon, 1980; Dillane, Fry, & Kalton, 1966), an estimated 80% of the acute low back pain patients have relapses, with each occurrence becoming more severe and longer-lasting (Hirsch, Jonsson, & Lewin, 1969; Horal, 1969). Haber (1971) notes that back and spine impairments are the major cause of morbidity and disability in the 18 to 44 year old population, and only 50% of the patients who suffer from chronic low back pain eventually return to work (Cailliet, 1981). Ng (1981) estimates that more than 15 million American adults suffer from CLBP which results in 93 million work days lost each year. According to Ramamurthy (1986), two million people are totally disabled and another five million are partially disabled by CLBP in the United States at any given time. Hirsch, Jonsson, and Lewin (1969) suggest that in Sweden back pain affects men and women about equally (14% and 18% respectively). Fordyce et al. (1984) found that in North America the ratio of CLBP is 33% males to 67% females.

It is estimated that more than 15% of all industrial injuries and more than 20% of all compensation payments made in any given year are low back related (Sternbach, Wolf, & Murphy, 1973). Nachemson (1976) indicates that low back pain is the most expensive medical problem in the 30 to 60 year old age group. Brena and Chapman (1984) and Schaepe (1982) estimate that the cost of treatment and compensation for low back problems in the United States alone exceeds fourteen billion dollars per year. Bonica (1982) estimates that in 1980 the direct health cost in the United States for back pain was $8.33 billion, for disability was $7.1 billion, and for loss of earning and services was $7.77 billion, for a total of $23.2 billion. According to the Back Association of Canada, in 1988 alone

nine million working days were lost due to back pain and the direct health cost was $2 billion.

Consequences of CLBP

While the above figures may reflect the pervasive nature of the disorder and the monetary cost to society, they do not reveal the extent of the emotional cost to the patient and his family. Many patients tend to experience persistent pain and functional disability far in excess of what would be expected on the basis of identified, underlying pathology (Carron, 1982). Consequently, they come to feel that they are passive victims of their own circumstances and that they have no mastery over their fate or destiny (Strong, 1985). The most common concomitants of CLBP are dependency, intrinsic anger, guilt, fear, anxiety, hopelessness, and depression (Turk & Holzman, 1986). These psychological disorders tend to be amplified by the repeated failures in obtaining relief (Turk & Flor, 1984). Thus many chronic low back pain sufferers are firmly convinced that there is nothing they can do to manage their pain, that their situation is hopeless, and that they are useless to themselves and others.

Bonica (1982) noted:

> Many patients with persistent chronic low back pain undergo a progressive physiologic, psychologic, and emotional deterioration; progressive decrease in physical activity; reactive depression; hypochondriasis; and other serious emotional reactions. The social effects of chronic low back pain are equally devastating, and patients become estranged from family and friends. They decrease their social interaction, and are unable to work, or lose their jobs. There is no doubt that low back pain is one of the most frequent causes of disability, and one which imposes an enormous economic burden on society. Even more important is the cost in terms of human suffering, not only on the part of the patient, but also on family and friends. (p. 13)

Diagnosis and Treatment of CLBP

Belkin (1985) observes that "the diagnosis and treatment of low back pain is among the most difficult, demanding and discouraging prevalent problems in medicine" (p. 333). The traditional medical approach to CLBP has been predominantly characterized by a somata-sensory model. Pain is seen as a purely sensory event, and the pain experience is invariably assumed to be directly proportional to injury or tissue damage. The various medical treatment approaches to chronic low back pain are predominantly symptomatic, aimed at reducing the level of pain and improving mobility. However, because of the somatic obscurity of the symptoms—notwithstanding advanced medical knowledge and technology—oftentimes the pain and the functional impairment prevail. This unrelentlessness of refractory low back pain to symptomatic treatment heightens the recognition that CLBP is more than a simple transmission of sensory signals.

In recent years, as a result of a contemporary conceptualization of pain as a multidimensional phenomenon, new modes of psychological interventions have emerged. Presently, the most popular treatment approach is cognitive-behavioral therapy. The cognitive-behavioral perspective is theoretically related to the Gate-Control theory (Melzack & Wall, 1965) in viewing pain as a multidimensional construct, resulting from the interaction of sensory, affective, behavioral, and cognitive factors, jointly contributing to the subjective pain experience. Its basic assumption is that behavior of individuals is determined not only by sensory phenomena but also by the way they construe their world and assign meaning to events (Turk & Flor, 1984). A cognitive-behavioral approach conceptualizes chronic pain problems in terms of coping skill deficits in either the cognitive

or behavioral domains (Cicconce & Grzesiak, 1984). Cognitive-behavioral therapists advocate that by altering cognitions (attitudes, beliefs, thoughts, and expectations) and overt pain behavior to more adaptive ones, emotional states (such as exacerbation of anxiety, depression, and hopelessness) and the perceived intensity of the pain may be attenuated.

C. The Study

Statement of the Problem

Though there is some clinical evidence which substantiates the utility of cognitive-behavioral approaches to CLBP patients, the outcome measures are often vague and the methodology unsound. More empirical research which utilizes systematic intervention and comprehensive standardized assessment of the psychological and behavioral correlates of CLBP is needed to verify the effectiveness of cognitive-behavioral treatment.

Purpose of the Study

The present study was designed to compare CLBP patients to No-Pain subjects on various measures in order to discern differences and to evaluate the efficacy of cognitive-behavioral therapy in attenuating CLBP and in improving CLBP patients' coping ability and sense of well-being.

Research Questions

The main research questions considered were:

1. Are CLBP patients different from No-Pain subjects in emotional stress, locus of control beliefs, and coping strategies?

2. Is cognitive-behavioral treatment effective in lessening chronic low back pain?

3. Does cognitive-behavioral treatment effect changes in CLBP patients' coping strategies?

4. Does cognitive-behavioral treatment effect changes in CLBP patients' locus of control beliefs?

5. Does cognitive-behavioral treatment effect changes in CLBP patients' emotional distress?

6. What are the relationships among emotional distress, coping strategies, locus of control beliefs, and pain dimensions?

The analyses of these research questions provide a basis on which to make specific hypotheses for future research.

Design of the Study

One hundred and forty subjects, forty CLBP patients and one hundred No-Pain subjects, completed a battery of questionnaires which assessed their level of emotional distress, spontaneous coping strategies, perceived locus of control, and pain suffering. Eighteen of the CLBP patients underwent cognitive-behavioral therapy which consisted of six weekly group sessions. The CLBP patients and No-Pain subjects were compared on all measures to determine differences and similarities; the Post-Treatment mean scores were compared to Pre-Treatment and No Treatment to determine changes which could be attributed to treatment effect. Data collected were analyzed using standard descriptive MANOVA, ANOVA, and Correlational statistics.

Organization

Chapter II contains a representative literature review, Chapter III specifies the methodology used in the study, Chapter IV reviews the results, and Chapter V consists of discussion, conclusion, and suggestions for future research.

II. REVIEW OF THE LITERATURE

Because CLBP shares many similarities with other chronic pain syndromes, the review will first cover issues of pain and chronic pain in general and then address the specific characteristics of CLBP.

A. Definition of Pain

Semantics

Man must have known pain since the beginning of time. From birth, human infants are responsive to noxious stimuli and display vocal and nonverbal behaviors that adults interpret as signs of pain (Owens, 1984; Craig, McMahon, Morison, & Zaskow, 1980). Yet, despite its timeless, ineluctable presence, pain remains disconcertingly indefinable and its nature is still somewhat elusive.

Even though no one can deny the link between pain and real or threatened tissue damage, the link is so variable (pain may occur in the absence of injury or long after an injury has healed) that pain cannot be defined exclusively in somatic terms. If pain is hurt, then how does one define "hurt"?

Like many concepts entrenched in everyday language and experience, there is no universally accepted definition of pain. Clark and Hunt (1971) assert that pain is a label that observers and pain sufferers attach to a complex set of events or phenomena. According to Fordyce (1976, 1978), "pain" is a term used to describe many disparate phenomena, both physical and psychological, associated with the effects of noxious stimulation and environmental contingencies. Melzack (1983) notes that,

> The diversity of pain experiences explains why it has been impossible, so far, to achieve a satisfactory definition of pain. Pain is not a single quality of experience that can be specified in terms of defined stimulus conditions. The word "pain" represents a category of experiences, signifying a multitude of different, unique events having different causes, and character-

> ized by different qualities varying along a number of sensory and affective dimensions. (p. 144)

Gildenberg and Devaul (1985) report the dissension in the definition of pain among scientists in a multidisciplinary international conference on pain:

Neurophysiologists—used the term "pain" to mean the appropriate response of specific pathways within the nervous system to a noxious stimulus with the potential for producing tissue injury.

Neurologists—referred to "pain" as nociception which can be defined as the process of neurosensory signaling by which a noxious stimulus detected by peripheral receptors is transmitted through neuronal relays to the thalamus and eventually to the central cortex.

Physicians—viewed "pain" as a unidimensional signal of clearly identifiable disease, injury, or bodily dysfunction.

Psychiatrists—saw "pain" as meaning that a patient was in distress.

Clinical psychologists—saw "pain" as referring to what the individual complained about, whether or not a physiologic stimulus was identified.

Gildenberg and Devaul observe that each scientist presentor spoke only to the members of his own discipline group, and no one attempted to include or clarify in his presentation his definition of the term "pain." Operationally, they suggest that using such an ill-defined term as "pain" makes it difficult for a patient to convey his feelings to a care giver who may be using a different definition and may apply to it an entirely different meaning. As Hobbs and Yazel (1982) observe,

> The surgeon may equate pain with tissue disruption; the neurologist thinks of receptors firing impulses along tracts and relay ganglia; the neurochemist envisions excitatory and inhibiting transmitters moving across synapses to receptor sites; the behaviorist records and manipulates pain behaviors; the psychiatrist looks for guilt atonement, losses, and interpersonal messages in pain; but the victim knows only that he hurts, and is suffering intensely. (p. 70)

To summarize, it appears that pain research has not yet advanced to the stage where an accurate definition of pain can be formulated. Rather, pain must be seen as a highly personal inner experience, influenced by cultural factors, the subjective meaning of the situation, and the idiosyncracy of the individual.

Types of Pain

Merskey and Spear (1967) differentiate between "organic" and "psychogenic" pain. They define psychogenic pain as "either pain which is independent of peripheral stimulation or of damage to the nervous system and due to emotional factors, or else pain in which any peripheral change (e.g. muscle change) is a consequence of emotional factors" (p. 19). Organic pain was defined as "pain which is largely dependent upon irritation of nerve endings or nerves, or else due to a lesion of the central nervous system, including some possibly patho-physiological disturbances like causalgia" (p. 19). According to Merskey and Spear, pain is initially almost always assumed to have an organic etiology. However, if a pain problem persists for months, and if the degree of pain appears to exceed the normative expectations for a particular organic pathology, or if the pain disables the person more than might generally be expected, the hypothesis is frequently changed and the person is usually alleged to have some form of "psychogenic" pain.

Barber and Adrian (1982) indentify three categories of pain: physiologic pain—a pain which results from the appropriate response of an intact nervous system to a noxious or tissue-destructive stimulus which may arise from pathology within the body; pathologic pain—a pain that occurs from pathology of the nervous system rather than pain which occurs from pathology elsewhere in the body; and psychogenic pain—a pain that occurs when no somatic stimulus is evident. They note that the term "psychogenic pain" is often used in two rather different

ways. The broader view of the term is as an attempt to label or identify situations in which there are or appear to be a discrepancy between the display of pain behaviors and the lack of noxious stimulation acting on peripheral receptors. The most specific use of the term views the noted apparent discrepancy in terms of alleged underlying personality or motivational disorders. Chapman (1988) observes that the term "psychogenic" is often confused with "malingering," with the inferences that the patient consciously fakes or distorts symptoms for the purpose of achieving some gain. Sternbach (1978b) points out that when the term "psychogenic pain" is used, the user is embarking on an attempt to explain pain behaviors and not simply to describe them; there is the implication of mind-body dualism and cause and effect relationships. Flor and Turk (1984) suggest that the prevalence of persisting pain syndromes for which the physical bases are obscure lead to the development of a dichotomy of somatic (true) pain and functional or psychogenic (imaginary) pain. They observe that psychogenic pain is often viewed as being within the domain of psychiatry and psychology rather than medicine. Blumer and Heilbronn (1981) argue against the notion of causal linear relationships between emotional factors and psychogenic pain. They observe that the psychological components of the pain experience operate in all organic pain situations.

Liebeskind and Paul (1978) summarized the controversy as follows:

> While it is often useful to distinguish between various aspects of pain experience (e.g. "sensory-discriminative" versus "motivational-affective" components), other dichotomous terms used in an attempt to specify the origin of pain ("physiological" versus "psychological," "organic" versus "functional") connote a Cartesian dualism and should have been discarded long ago. (p. 42)

As an alternative, they suggest distinguishing between acute and chronic pain.

Wolff (1980) indicates that when a patient complains of pain of recent onset, it can be assumed that there is a pathological process underlying the complaint and that the pain is acute. The overall pattern in acute pain is one of emergency response; therefore attention is usually directed to analyzing and diagnosing the underlying bodily process and treating the etiological condition. It is assumed that the acute pain is temporary and that it will subside when healing occurs. On the other hand chronic pain, according to Wolff, "is a physical pain state, triggered by some organic event, where the underlying etiology may have healed, responded to treatment, or disappeared, but where the pain continues almost independent of any organic basis" (pp. 27-28). Another distinction between acute and chronic pain is the characteristic autonomic state of arousal associated with acute pain. Crue (1976), Sternbach (1978a), and others have detailed the usual physiologic response to painful stimuli. Acute pain causes a "flight or fight" response with a high degree of anxiety and sympathetic arousal. This type of arousal is absent in patients with chronic pain. Furthermore, patients suffering from acute pain can usually give a clear description of its location, intensity, and intermittent character. By contrast, chronic pain is more persistent and its localization is more vague.

Marcus (1981) offers an operational definition for chronic pain based on three observable factors: chronic pain persists longer than would be expected for the underlying organic condition, the pain becomes the center of the patient's life, and the patient displays significant pain behavior; associated phenomena such as depression, curtailment of social activity, and loss of friends and interests can be observed. Melzack and Dennis (1978) have noted that the time course of pain is profoundly important in determining its psychological effects. Acute

pain usually has a phasic component, a rapid onset, and a short time course which vanishes after healing has occurred. With chronic pain, the tonic component which commences when the phasic component is over may persist long after the injury has healed.

One of the basic differences between chronic and acute pain is time. According to some authors, chronic pain is considered to be pain which continues unabated for at least six months. The six-month rule was initially developed by Sternbach (1978a) and is based on his study of MMPI differences between patients who had suffered from pain for less than six months compared with those who had experienced pain six months or more. Sternbach indicated that patients with an illness that lasted six months displayed personality differences compared with patients with the same illness who had symptoms less than six months. Although there has been some controversy about using an apparently arbitrary time period as the sole determiner of chronicity (Wolff, 1980; Aronoff, 1981), there is general acceptance of the six-month rule in the literature.

B. Theories of Chronic Pain

Pain is primarily seen today as a signal which indicates that the integrity of the organism has been breached or is being threatened. Yet throughout most of recorded history, pain has been characterized as an affective feelings state rather than sensation. Aristotle was responsible for the enduring ideas that viewed pain as an emotion within the domain of the mind rather than the physical body. To the ancient Greeks, pain was an emotional state counterpart of pleasure and distinct from the classic five senses. The Stoic philosophers further advocated that because pain was located within the mind it should be "overcome" through logic and "rational repudiation" rather than physical intervention.

Neuro-Physiological Theories

According to Bonica (1980), the view of pain as a predominant emotion prevailed until 1664 when the French philosopher Rene Descartes attempted for the first time to explain pain in terms of its anatomical and physiological mechanisms. Descartes proposed that pain is a sensory system, like hearing or vision, possessing its own specific neurological substrates. Descartes' tenet that the transmission of pain information is carried along a direct and specific path from peripheral pain receptors in the skin to a pain centre in the brain underwent little change until the nineteenth century. In 1842, Muller postulated the existence of specific fibres from receptors to the spinal cord and specific pathways in the spinal cord; and Von-frey proposed "specific nerve energy" on the basis of fibre size, with a straight-through transmission to a specific brain centre. About the same time, Goldcheider (1894) developed the pattern theory of pain, which was based upon the assumption that pain is evoked by a summation of sensory inputs at the dorsal horn cells. He suggested that pain is produced when the total output of mechanical, thermal, or clinical stimuli exceeds a critical level of a threshold magnitude of intensity.

The remarkable development of sensory physiology and psychophysics during the nineteenth and twentieth centuries has, in Western doctrine, served to reinforce the perspective of pain as unidimensional sensation associated with tissue pathology. Most contemporary medical texts still consider pain primarily in sensory terms of discrete and specific receptors and nociceptors while the affective and cognitive components are relegated a secondary role as "reactions" to the whole pain process (Engel, 1977).

Gate-Control Theory

Melzack and Wall (1965) were the first to offer a viable alternative conceptualization to the traditional neuro-physiological view of pain with their integrated multidimensional framework which postulates pain as a complex psychophysiological phenomenon. Melzack, Wall, and Casey (Melzack & Casey, 1968; Melzack & Wall, 1965; 1970; 1982; Wall, 1978) assert that pain is not simply the end product of linear transmission of sensory signals but rather a dynamic, multi-level process which involves continuous interaction between complex ascending and descending systems. They purport that sensory input is subject to the modulating influences of cognitive, affective, and behavioral factors before it evokes pain perception. As Melzack and Wall (1982) observe,

> Pain has obvious sensory qualities but it also has emotional and motivational elements. It is usually caused by intense, noxious stimulation, yet it sometimes occurs spontaneously without apparent cause. It normally signals physical injury, but it sometimes fails to occur even when extensive areas of the body have been seriously injured; at other times it persists after all the injured tissues have healed and becomes a crippling problem ... often more debilitating and intolerable than the disease process which initiated it. (p. 9)

The basic assumption of the Gate-Control theory is that there is, within the substantia gelatinosa of the dorsal horns of the spinal column a neural mechanism which acts as a pain gate. This "gate" can either facilitate or inhibit the flow of nerve impulses from peripheral fibres to the central nervous system. This is done through the reciprocal activity of the large-diameter A-beta and the small-diameter A-delta and C fibres, and the influence from the cortex via the descending pyramidal and extrapyramidal tracts. When the amount of information that passes through the gate exceeds a critical level, it activates the neural mechanisms responsible for pain experience and response. The large, fast-conducting A-beta fibres can depolarize the intramedullary afferent terminals, close

the gate, and thereby decrease the effectiveness of the excitatory synapses and lower the experience of pain. The small-diameter, slow-conducting A-delta and C fibres have the opposite effect, as they open the gate and potentiate the experience of pain.

According to the Gate-Control model, cerebral processes such as cultural learning, anxiety, and present meaning of pain influence the selection, obstruction, and synthesis of the pain information received from the sensory input. For example, general anxiety, worry over the consequences of pain, the perceived meaning and attention to pain may all stimulate the small-diameter fibres and thus enhance the pain experience. On the other hand relaxation, focusing one's attention on something else, and general mental calmness can stimulate the large-diameter fibres and thus decrease the experience of pain.

The Gate-Control model views pain perception responses as complex multidimensional phenomena resulting from the interactive modulating influences of sensory-discriminative, motivational-affective, and cognitive-evaluative components. The sensory-discriminative aspects refer to the processes that underlie the localization and identification of the noxious stimulus. The sensory-discriminative function is to transmit basic sensory information and to indicate where it hurts and what it feels like. The motivational-affective aspects refer to the characteristic unpleasant feeling of pain and the desire to escape from the pain either by withdrawing from its source or by trying to eradicate it. The motivational-affective component is also responsible for the emotional reaction to the pain. The cognitive-evaluative aspects refer to the conscious mental processes that underlie an encounter with pain. The cognitive-evaluative dimension of pain determines the meaning of the sensory experience.

The validity of the Gate-Control theory has been widely debated over the past twenty-four years, the majority of critics arguing over the specific anatomical and neurophysiological mechanisms that can account for triggering the action system and the perceived pain. Although the posited physiological and anatomical bases for the Gate-Control theory have been criticized (e.g. Kerr, 1975; Liebeskind & Paul, 1978; Nathan, 1976), the multidimensional perspective has received considerable support (e.g. Hilgard & Hilgard, 1975; Melzack, 1980; Tursky, 1976). Wall (1978) acknowledged that in view of more recent neurological discoveries, certain modifications in the Gate-Control assumption are in order (for example the role of the substantia gelatinosa may require re-definition and the large-diameter cells are probably more involved than was originally assumed). Yet, Wall (1978) and Melzack and Wall (1982) assert that the basis of the theory, the premise that there is a pain gate influenced by peripheral afferents and by impulses descending from the brain, has been repeatedly confirmed.

Notwithstanding some of its criticisms, the Gate-Control model remains the most influential of all contemporary theories of pain. As noted by Weisenberg (1977):

> Regardless of the accuracy of the specific wiring diagrams involved, the gate-control theory of pain has been the most influential and important current theory of pain perception. It has generated new interest in pain perception, stimulating a multidisciplinary view of pain for research and treatment. (p. 1012)

That Gate-Control predominance is evident in the analogous conceptualization of pain which was incorporated into the definition of pain by the International Association for the Study of Pain's Task Force on Taxonomy (1979). They defined pain as "an unpleasant sensory and emotional experience associated with actual or potential tissue damage, or described in terms of such damage" (p. 250). This

definition conveys the multidimensional and subjective nature of pain for various etiologies. The Gate-Control theory has also had a profound impact on the conceptualization and treatment of pain over the last two decades. It has stimulated the growing interest in the role of psychological processes in the etiology, exacerbation, and persistence of chronic pain; and it emphasizes the need for the use of an integrative, psychophysiological approach to the theory and practice of pain control.

Classical Conditioning

In classical conditioning, learning takes place when an unconditioned stimulus (UCS) that produced an unconditioned response (UCR) is made temporally contiguous with a conditioned stimulus (CS) (Kimble, 1967).

The respondent model, as described by Gentry and Bernal (1977), suggests a classical conditioning of the pain-tension cycle. Pain is viewed as antecedent and reactive to muscular hypertension and environment contingencies. Avoidance of movement may be used to reduce pain, leading to immobility that may increase the tension and pain still more. Also, when pain is persistent, many aspects of the environment can become classically conditioned to the painful sensation as a CS. Thus various environmental situations can elicit a CR that is similar in nature to the usual reflexive response to painful sensation. This process goes on without the necessity of the awareness of the person being conditioned. The CR is just as real as the response that occurs directly to painful sensation. Furthermore, since CS's acquire the same valence—either positive or negative—as the original UCS possessed, the CS becomes as aversive as was the original painful sensation.

Operant Conditioning

Fordyce (1976) proposed a radical departure from the traditional sensory view. Prior to Fordyce, there had already been a trend to move away from the "purely medical model" to the inclusion of psychological variables. Fordyce, however, completed this swing by presenting a "purely psychological model of pain" based upon operant conditioning and governed by stimulus-response orientation. Fordyce (1978) stressed that since pain is not directly observable, all that can be known about pain is based on some behavioral manifestations (verbal and nonverbal) which are usually indicative or attributed to subjective pain. He maintains that pain behaviors fall into two categories: innate reflexes and learned. He argues that pain behaviors are significant in their own right beyond a simple expression of underlying causative factors. He asserts that although pain behaviors may be elicited initially by a nociceptive stimulus, invariably environmental contingencies are the more likely determinants as to whether pain behaviors will continue or disappear. According to Fordyce, the persistence of pain behaviors is mainly dependent upon direct positive reinforcement such as sympathetic attention, bedrest and analgesics, and negative reinforcement such as avoidance of aversive situations or minimizing exposure to unpleasant consequences.

Psychodynamic and Pain Proneness

Breuer and Freud (1955) postulate that unconscious mental conflicts may result in conversion symptoms like pain. Pain has been viewed as a conversion neurosis resulting from a compromise between the fulfilment of a "forbidden wish" and its punishment (Merskey, 1987). In psychodynamic theories, pain is related to aggression hostility and guilt (Szasz, 1957). Engel (1959) views chronic pain as the somatic expression of unresolved psychic conflict. He coined the

term "pain prone" patients to describe individuals who manifest masochistic traits and self-punitive behavior. These develop as a result of a strong, unfulfilled, aggressive drive; a history of suffering and defeat; an intolerance of success; and a prominence of guilt instilled by unresponsive parents.

Blumer and Heilbronn (1982) have expanded upon the work of Engel and suggest that the clinical features of the pain-prone disorder include denial of conflicts; lack of initiative; inactivity; inability to enjoy social life, leisure, or sex; insomnia; dependency; as well as a family history characterized by depression, alcoholism, and chronic pain. Minuchin, Rosman, and Baker (1978) point out that factors such as guilt enmeshment and need for control, escape from unresolved conflicts, hidden animosities between family members, and rigidity in family structure and approach to pain all play important parts in the production of "pain proneness."

Elton, Stanley, and Burrows (1978) argue that pain may be learned as a form of coping in early childhood which may predispose the patient towards the development of a pain-prone personality. For example, if children learn that pain is rewarded by a caring attitude or greater attention by the parents, they are more likely to use pain to gain attention and caring when other means of attaining them have failed. Elton, Stanley, and Burrows (1983) also found that pain in "pain prone" patients seemed to provide a way out of facing difficult situations and decisions and as means of explaining their perceived failures to achieve desired goals. Hirschfield and Behan (1966), in their classic study of 300 workers who were involved in industrial accidents, discovered that in almost every case a psychological process occurred in which the injury became the solution to the patient's problem. They observe that instead of having a presenting com-

plaint of anxiety, depression, or other psychiatric symptom, the patient had the physical disorder which was the result of the accident. This rescued him from unbearable and unacceptable psychological tension by the phenomenon of being "sick" (p. 197). Weinstein (1978) notes that there are certain characteristics which make one prone to be involved in a disability injury. He cites low self-esteem, inability to deal competently with a stress-demanding job, and tension at home. Weinstein too maintains that injury is viewed by the pain-prone individual as a socially acceptable way out of a stressful situation. Blumer (1978) describes the pain-prone person as one who typically had an unhappy and often traumatic childhood, a personal and/or family history of illness, was forced to accept adult responsibility at an early age, and was left with unmet dependency needs. According to Blumer, pain becomes a legitimized way for the person to assert, "Now it's my turn to be taken care of."

Modeling/Observational Learning

Bandura (1977) argues that vicarious or observational learning forms the basis of acquiring new patterns of behavior in the absence of direct experience. Craig (1978) argues that in order to protect a child from harm, modelling of pain experience is essential. It substitutes vicarious experience for direct suffering and teaches avoidance of potentially painful situations. At the same time it trains the individual in specific patterns of behavior appropriate to either the expression or suppression of pain. Craig (1984) observes that initially, infant pain behavior appears to be reflexive, more spontaneous, and diffuse; but as perceptual, cognitive, and behavioral capacities for interaction with the environment emerge in the first year of life, pain expression begins to display instrumental qualities, as parents and other care takers systematically shape the pattern of

expression. Clinical studies have indicated correlational relationships between parental and offspring pain symptomatology for abdominal pain and low back pain (Craig, 1978) and headache (Turkat, Kuczmierczyk, & Adams, 1984). There are obvious differences in pain experience among various cultural and ethnic groups. The consistencies within such groups suggest that there are some normative standards for both the degree of suffering which should be freely expressed and for the appropriate form of the expression of pain. Tursky and Sternbach (1967) found that differences among groups in attitudes toward pain can influence pain tolerance as well as physiological responses to repeated pain stimuli. They noted that group members who readily complain of pain in situations where others do not may be looked upon as neurotic or having a low pain threshold. Zborowski (1969) and Bond (1980) argue that people are continually exposed to environmental contingencies and social modeling that exert an influence on pain expression. Craig (1978) has demonstrated in an elaborate series of laboratory studies that observation of displays of pain and suffering can influence the autonomic response of the observers (increased autonomic arousal) and the extent to which observers tolerate pain themselves. Craig hypothesizes that modeling processes form the basis for pain behaviors unrelated to verified pathology.

Family Theories

Psychosocial stressors such as familial modeling are thought to contribute to the development, exacerbation, and maintenance of chronic pain (Violon & Giurrgea, 1987). Merskey and Spear (1967) cite Freud as the first to observe the familial incidence of pain, which he thought was hereditary. They note that with the focus shifting away from nature to nurture, emphasis has been put on

the important role that the family of origin plays in the manifestation of pain, in pain threshold, pain tolerance, and pain complaints. Minuchin et al. (1975) found that families of children with psychosomatic symptoms, including chronic pain, demonstrate several clear, interactional characteristics including rigidity, overprotectiveness toward the sick member, poor problem-solving capabilities, and overinvolvement or enmeshment with one another. Swanson and Maruta's (1980) findings support the hypothesis that these characteristics apply to the families of adult patients with chronic pain too. Minuchin, Rosman, and Baker, (1978) suggest that the origin of chronic pain and the choice of the symptom may be determined by the family system's dynamic. The immediate precipitation of the symptom may be caused by a threat to the family homeostasis; as the patient becomes a chronic invalid, the change in the family organization goes beyond the dynamic needs to detour tensions and conflicts. The family feedback to the pain sufferer's symptoms becomes an autonomous process that maintains the symptomatology and the new stability it provides to the family system. Waring (1977) proposes a model of "significant others specificity" in which random symptoms evolve into a chronic pain problem via a scapegoating reinforcement and projection in order to stabilize the family system. He observes that families of chronic pain patients often demonstrate an inability to express thoughts and feelings. Block, Kremer, and Gaylor (1980) have found that chronic pain patients whose spouses were solicitous reported significantly higher levels of pain and longer histories of pain than did the non-solicitous group. It was reported that chronic pain patients expressed low marital satisfaction and poor sexual adjustment (Mersky & Spear, 1967). However, the familial distress reported by pain patients

may be potentiated by somatic and psychological disturbances in the spouse. Shanfield, Heiman, Cope, and Jones (1979) note that spouses of chronic pain patients have a tendency toward high levels of psychological distress. Mohamed, Weisz, and Waring (1978) found that the spouses of chronic pain patients are likely to develop pain problems themselves often in the same loci as their mates. It can be hypothesized that it is specific familial characteristics and/or behavioral responses of family members or spouses that may serve to maintain and exacerbate chronic pain.

C. Assessment of Pain

A comprehensive measurement of pain is essential for the study of pain mechanisms and for the evaluation of treatment effects. Yet pain is such a subjective experience that it is difficult to quantify. As observed by Fordyce (1983),

> Strictly speaking clinical pain is a private matter. It exists only because someone says he or she has a pain problem. The nature of the pain, the intensity, impact, and even its very existence are discernible only by something the suffering person says or does (p. 145).

However, since one cannot measure directly the antecedent stimulus of pain, one must rely on an indirect measure of pain response, usually a variant of verbal report. The most common measurement strategies have usually involved either a visual analogue or magnitude estimation. The visual analogue scale utilizes a straight line as an indicative of intensity continuum (e.g. from "no pain" to "worst pain possible"). Magnitude estimation asks the patient to assign a numerical value (usually 0-10 or 0-100) to his pain. Such unidimensional global ratings of pain have many limitations. Keefe and Brown (1982) note that validity coefficients based on such measures, even under optimal conditions, are likely to remain

modest because pain measured along the unitary dimension of intensity fails to recognize the reactive (emotional) and sensory (feeling) characteristics of pain. Furthermore, misconceptions about the effectiveness of treatment can occur when investigators use assessment techniques that measure pain intensity only to evaluate therapeutic strategies that attempt to modify psychological reactions to pain.

The construction of the McGill Pain Questionnaire (MPQ) (Melzack, 1975) departed from the traditional categorical, visual-analogue, and rating scale formats. The MPQ is conceptually related to the Gate-Control model. It was designed to separate and quantify the three interrelated but conceptually distinct components of pain: sensory-discriminative, motivational-affective, and cognitive-evaluative. The MPQ is based on Thurstonian scaling procedures incorporating 78 adjectives frequently used by patients to describe their pain experience (Melzack & Torgerson, 1971). These adjectives are segregated into 20 sets of verbal pain descriptors, with each set containing up to six words in an empirically determined ascending order of pain intensity. The MPQ provides three pain rating indices based on the rank values of the word for the different dimensions of pain. Ten word groups which describe pain in terms of its temporal, spatial, pressure, and thermal properties are designed to measure sensory-discriminative dimensions of the pain experience. Five word groups that describe pain in terms of its associated tension, fear, and autonomic properties are designed to measure the motivational-affective dimension of pain. A single set that describes subjective aspects of the total pain experience (e.g. annoying, miserable, unbearable) was designed to measure the cognitive-evaluative dimension of pain. The remaining four word groups are currently classified as miscellaneous and appear to describe potentially

sensory components. Respondents are asked to check the one word in each relevant set that best describes their pain and to indicate their present pain intensity.

The effectiveness of the MPQ multidimensional approach as an evaluative instrument has been clearly demonstrated. Numerous exploratory factor-analytic studies of the MPQ have been conducted to determine whether its a priori factor structure is consistent with the postulated three components of pain. Most studies support the MPQ content and construct validity (Kremer, Atkinson, & Ignelzi, 1982; Reading, 1983; Melzack, Terrence, Fromm, & Amsel, 1986; Turk, Rudy, & Salovey, 1985). The convergent validity of the MPQ was demonstrated by the significant correlation between the affective dimension of this instrument and other independent measures of affect such as the Brief Symptom Inventory (Kremer & Atkinson, 1981) and the MMPI (McCreary, Turner, & Dawson, 1981). Furthermore, the sensory dimension of the MPQ which reflects pain intensity correlates well with scores obtained using visual analogue scales (Gracely, McGrath, & Dubner, 1978). Further support of validity is derived from the MPQ's ability to discriminate among various chronic pain syndromes (Dubbison & Melzack, 1976; Leavitt & Garron, 1980). The MPQ has made significant contributions to the measurement of clinical pain and is the most widely used self-report pain measure in studies of chronic pain (Keefe, 1982).

D. Psychological Correlates of Chronic Pain

Emotional Distress

Man alone among all living creatures is conscious of self. Consequently, when pain strikes it is not simply the affected limb or inner organ that hurts—his entire personality is called into the experience and is affected by it. Research shows that for many chronic pain patients, persisting pain is an emotionally laden

and frightening experience. Fields (1987) noted that the subjective experience of pain includes an urge to escape from the cause of it, or at least to obtain relief. As Melzack (1973) observes, "Pain has a unique, distinctly unpleasant, affective quality that ... demands immediate attention, and disrupts ongoing behavior and thought. It motivates or drives the organism into activity aimed at stopping the pain as quickly as possible" (p. 93). It is this overwhelming desire to make it stop that gives pain its power. People have understood this power for millenia, using painful punishment (or the fear of it) to control the behavior of others. Many parents, for example, punish their children physically for wrong-doing; children learn very early to associate pain with actions disapproved of by others. Because much of a human's behavior is shaped by the desire to avoid pain, the psychological reaction to it can be as complex as the individual who experiences it.

Gildenberg and Devaul (1985) differentiate between pain and suffering. They suggest that when pain occurs from a physical cause such as illness or injury, the immediate manifestation is the individual's awareness of the pain. If the pain is not promptly alleviated, suffering or emotional distress may evolve as distinct from the pain itself. Parsons (1951, 1964) formulated the sick-role concept which codifies the various privileges and responsibilities which are conditionally granted to individuals if they can show evidence of disability or disease over which they have no control and which brings them little benefit compared to their suffering. According to Parsons, the bona fide sick-role occupant is entitled to sympathy and respect. He is protected from any social condemnation and loss of dignity; his self-concept, which tends to mirror his evaluation by others, is shielded from guilt, shame, and any other demeaning feelings. Pain is a highly

significant element in one's self-definition as being sick. Sudden acute pain serves as an almost unqualified immediate entry to the sick role.

Chronic pain, however, presents a different situation clinically and socially. A chronic pain patient is much more likely to have difficulties in sustaining sick-role identity than persons with clearly diagnosed diseases. Typically chronic pain patients present no apparent cause and the intensity of their alleged pain cannot be validated by any objective measures. Therefore all the diagnostic inferences (and treatment judgements) must be based predominantly on the patient's verbal account (e.g. description of his pain experience and how much it hurts) and observed pain behaviors (e.g. facial expressions, vocalization, gait, and body posture). Such diagnostic inferences about the nature and type of pain are invariably subject to distortion and idiosyncratic judgement calls on the part of medical doctors who are entrusted, according to Pilowsky (1987), with the responsibility of establishing whether the symptoms in question represent "normal" or "abnormal" illness behavior.

Fagerhaugh and Strauss (1977) propose that doctors have "pain trajectories" which are explicit expectations concerning painful conditions. They often view the intensity and the duration of chronic pain as far exceeding the expected trajectory and therefore diagnose it as "abnormal illness behavior." As a result, physicians may be hesitant to consent to the chronic pain patient's demand for sick role entitlement; they may think that the patient tries to use more "sick role units" than merited and will attempt to pull him "back into line." Part of the distortion, according to Hackett (1978), is the patients' own doing and their learning to live with the pain. As acute pain advances into the chronic phase, many of the overt stereotyped pain behaviors are masked or fade. The chronic

pain patient is often able to sit quietly in the doctor's waiting room, looking good and showing no sign of suffering. Yet as soon as he steps into the examination room, he proceeds to bombard the physician with vivid descriptions of affliction and disability. Since observable pain behaviors are the most potent signals that communicate the fact that pain is being experienced, their absence frequently puzzles physicians (as well as significant others) by the seeming incongruity, and eventually they begin to doubt the reliability and authenticity of the patient's complaints (Leavitt & Garron, 1979). Many physicians are perplexed by the patient's unremitting calls for help, often despite the lack of pathologic conditions. They become further frustrated by the frequent failure of treatments to resolve the pain, in spite of their best efforts, and they eventually refuse to legitimize it as "physical." The classical medical model of pain assumes that if nothing is wrong in the soma, something must be wrong in the psyche. Consequently, physicians often dismiss the patient's intractable complaints derisively, stating categorically that "the pain must be all in your head." The chronic pain patient, on the other hand, has a "disease conviction" (Chapman, Sola, & Bonica, 1979). As he sees it, his difficulty is purely a physical malady which has nothing to do with his psyche (Rutrick & Aronoff, 1985); he characteristically denies that there is any psychological component to his problem (Pinsky, 1975). All the patient knows is that his pain is real and not imaginary and he feels misunderstood and rejected by the doctor who does not believe him and even considers him crazy. These differences of opinion lead to constant conflict between chronic pain patients and medical professionals accompanied by frustration, anger, and hostility (Pinsky, 1980; Mead, 1965). The fact that the chronic pain patient, perhaps more often than other chronically ill or disabled patients, needs official ratification

to qualify for potentially valuable secondary gains can intensify the conflict and misgivings.

During the interminable journey through the medical mill, the patient is adamantly searching for the doctor who will be able to diagnose and cure the pain. The patient is typically sent from one specialist to another, palpated, pricked, radiographed, submitted to a variety of technical examinations, to innocuous or painful diagnostic means, and to varied therapeutic procedures. As the pain persists in spite of the numerous treatments, the patient feels lost and desperate; and the more anxious or depressed he becomes, the more violently he feels the pain. Often, when a painful experience is prolonged, the results can be actual biological, emotional, sensory, and motor changes, each producing further discomfort and distortion of the way one perceives things. This has the effect of heightening the pain perception which increases the attendant anxiety and depression, which in turn decreases the tolerance and so forth. A vicious cycle is set up wherein the patient's emotional response to the pain and his concentration on pain lead to exacerbation of pain. Turk and Holzman (1986) describe how chronic pain patients progress through downward spiraling from initial optimism of "acute illness" beliefs (i.e. there is a specific cause for the symptoms, specific treatment for the symptoms, and a definite time course) through repeated high expectancies for curative treatments followed by despondence and embitteredness and eventually to giving up. As patients become more demoralized, they just succumb to the unremitting pain and discontinue any attempt to cope with the situation. These patients often reduce their activity levels, alter their social roles, and may come to view themselves as doomed victims to a life of misery. Sternbach (1978a) notes that in acute pain of recent onset or short dura-

tion, the patient's anxiety is predominant. He is worried about the implications of the pain, disability, and social problems. In chronic pain patients, worry gives way to discouragement, hope and relief give way to despair, and the future begins to look bleak. The patient often becomes depressed and despondent, either overtly or covertly. As Sternbach articulated, "A pattern of vegetative signs emerges: patients report sleep disturbance, appetite changes, decreased libido, irritability, withdrawal of interests, weakening of relationships, and increased somatic preoccupation" (p. 243). Seligman (1975) proposes that many pain patients report past adverse learning experiences which predispose them to feel helpless. Other empirical findings indicate that chronic pain patients suffer from lower self-esteem (Armentrout, 1979; Elton, Stanley, & Burrows, 1978; Schmidt, 1985), depressive symptoms (Blumer & Heilbron, 1982), and inactivity (Sternbach, 1978a). In the case where numerous treatments have failed and high stress levels continue to contribute to a patient's problems, the clinician is then faced with the characteristic responses of the chronic pain patient: resentment and depression; lowered activity levels; feelings of helplessness and hopelessness; overwhelming preoccupation with the pain problem; and impaired interpersonal and productive functioning. Frequently, chronic pain patients become dependent on opiodes, tranquilizers, barbiturates, and polydrugs. They develop a very sedentary lifestyle and eventually find that even minimal exertion creates pain sensation as they become even more sedentary and inactive. All of these result in continued concentration on suffering, which further increases their social isolation and exacerbates their pain and depression (Keefe & Gil, 1985).

Sternbach (1974) and Bonica (1979) document the emotional disturbances provoked by chronic pain. They observe that the longer the pain persists, the

greater the probability that the victim will become depressed, fearful, irritable, somatically preoccupied, and erratic in the search for relief. Pinsky (1979) observed that it is difficult for chronic pain patients to accept that they are "different," in the sense that their pain has not "turned off" or become modulated with the passage of treatment and time. Rutrick and Aronoff (1985) note that the duress of chronic pain can produce emotional trauma in the most stable individuals. Aronoff and Evans (1982) observe that chronic pain patients share many of the following characteristics: preoccupation with pain, strong and ambivalent dependency needs, feelings of isolation and loneliness, masochism, inability to take care of self-needs, passivity, lack of insight into patterns of self-defeating behavior, inability to deal appropriately with anger and hostility, and the use of pain as a symbolic means of communication.

Fishman and Loscalzo (1987) note that chronic pain patients experience a diminished volitional autonomy or willpower related to an inability to concentrate and direct the focus of attention through willful choice. The mind is invaded and occupied by the most intense stimulus in the perceptual field—the pain—and conscious experience is dominated by catastrophic thoughts and images of having dangerous diseases that no doctor is able to find and to cure or that the physicians are hiding something. Pinsky (1980) identified in chronic pain patients generalized dysphoria, physical decline, psychosocial withdrawal and interpersonal dysfunction, intensified feelings of hopelessness and helplessness, and a general loss of self-worth and self-esteem. Woodforde and Merskey (1971) report that emotional disturbances among patients without tissue pathology were equally as severe as disturbances among patients with demonstrable organic pathology. Kremer, Atkinson, and Ignelzi (1982) observed that chronic back pain and cancer pain

were associated with similar high affective loadings. Silbert and Rosomoff (1978) compare chronic benign pain patients with cancer patients. They report an approximate 100% increase in depression in both groups. The benign pain group, however, reported more suicidal ideation and more feeling of rejection and abandonment than did the cancer group. Guido and Merskey (1987) compared two groups of chronic pain patients, one group with no known lesions and the other with clear organic pathology. Even though the severity of pain did not differ between the two groups, 97% of the no-lesion group were diagnosed with psychiatric disorders (such as depression, hysterical psychosis, and anxiety neurosis) compared to 39% of the lesion group. Katon, Egan, and Miller (1985) report that 57% of chronic low back pain patients without organic lesions suffered from major depression disorders, 16% suffered from somatization, and 16% from panic disorders. Chaturvedi, Varma, and Malhotra (1984) report similar findings.

Beck (1976) suggests that distorted cognitions and beliefs are essential in the production and maintenance of depressive symptomatology. He hypothesizes that depressed individuals characteristically use faulty information processing reflected in errors of logic that sytematically misinterpret or distort the meaning of events in order to construe themselves, the world, and their experiences in a negative way. The cognitive model of depression (Beck, Rush, Shaw, & Emery, 1979) contends that the affective, motivational, and behavioral symptoms of depression are linked to the activation of idiosyncratic, negative-thinking patterns. Lefebvre (1981) found high similarity in the distorted cognitive processes of CLBP patients and depressed individuals. The findings suggest that pain plays a central role in the depression and subsequent cognitive distortion of CLBP. It is argued that both systematic errors in ongoing information processing and

depressogenic underlying assumptions serve to maintain the patients' beliefs in the validity of their distorted ideas. Clinical improvement, therefore, depends on persistent correction of faulty cognitions.

Locus of Control

One common characteristic of chronic pain patients is their general sense of loss of control. This perceived lack of control appears to be related to their feeling of helplessness and emotional distress. Bowers (1968) argues that the frustration associated with the feeling of powerlessness among chronic pain patients invariably aggravates their pain and intensifies stress reactions. The concept of locus of control had its origin in social learning theory. According to this theory (Rotter, 1966), through a learning process individuals develop a generalized expectancy that behavioral outcomes are contingent upon one's ability and effort (i.e. internal control) or that such outcomes are determined by others (i.e. external control). The central theme of locus of control is the individual's cognitive appraisal of the contingency relationship between actions and outcomes.

The original health locus of control scale was developed by Wallston, Wallston, Kaplan, and Maides (1976). It was designed to yield a single score, similar to Rotter's (1966) I-E scale. "Health Internals" were presumed to believe that they became healthy or sick as a result of their behavior. At the other extreme, "Health Externals" were presumed to have generalized expectancies that the factors which determined their health were beyond their personal control. Later, influenced by Levenson's (1974, 1975) arguments against the conceptualization of locus of control as a unidimensional construct, Wallston, Wallston, and Devellis (1978) consequently constructed the Multidimensional Health Locus of Control Scale (MHLC).

The central theme of health locus of control, according to Quinn and Norris (1986), is the cognitive appraisal an individual may bring to the reinforcement contingencies of a wide range of behaviors and situations. Miller, Roselini, and Seligman (1977), in their "learned helplessness" model, state that a perceived loss of control results in a feeling of helplessness, a notion they purport is synonymous with the concept of externalized locus of control. In a laboratory study by Davison and Valins (1969), subjects were given a test for tolerance followed by a placebo and then retested for pain. Those told that they had received a placebo attributed behavioral changes to their own efforts (internal attributes) and they tolerated more pain at retest than those who believed they had received a drug and attributed changes to the medication (external attribution). Geer, Davison, and Gatchel (1970) demonstrated too that just the perception of control over aversive stimulation, irrespective of actual control, was sufficient to heighten the pain threshold and reduce emotional arousal. Strickland (1978), in a review of the research literature, concluded that internals' expectancies are associated with a variety of positive health practices and better physical and psychological functioning. Beliefs in personal control have also been found to increase pain tolerance (Rosenbaum, 1980), alleviate anxiety (Houston & Holmes, 1974), and generally reduce discomfort (Staub, Tursky, & Schwartz, 1974). Sela and Jevne (1988) found that with cancer pain patients, perceived lack of self-control was associated with a higher level of reported pain, an enhanced sense of hopelessness, and maladaptive coping strategies. Turk and Rudy (1985) maintain that lower perceptions of self-control and self-efficacy are important mediators in the development of depressive symptoms among chronic pain patients.

Thompson (1981) concludes that the sense of loss of control is an important factor in the perpetuation of chronic pain. The inability to find relief contributes to feelings of hopelessness, helplessness, despair, and pessimism about the future which exacerbate further pain and disability that compound the initial problem.

Coping Strategies

The relation between stressful events and indicators of adaptational status such as somatic health and psychological symptoms is mediated by coping processes. According to Folkman, Lazarus, Gruen, and Delongis (1986), coping refers to the person's cognitive and behavioral efforts to manage (reduce, minimize, master, or tolerate) the internal and external demands of the person-environment transaction.

A number of studies (Barber & Cooper, 1972; Kanfer & Goldfoot, 1966; Scott & Barber, 1977; Tan, 1982; Turk & Genest, 1979) have shown that most people, when faced with noxious stimulation, tend to use some coping strategies which are already within their repertoire of responses. Copp (1974) interviewed a large sample of acute and chronic pain patients and found that the majority of them had developed cognitive and behavioral coping strategies to deal with their pain. Examples of cognitive coping strategies included praying, counting numbers, and focusing on distracting features of the environment. Behavioral coping strategies involved activities such as walking or talking to other people. Chaves and Brown (1987) studied the types of spontaneous coping strategies employed by patients undergoing dental extractions or mandibular block injections. The researchers report that 44% of the patients used cognitive strategies designed to minimize pain and stress while 37% of the patients engaged mainly in catastrophizing and other cognitive activities which actually exaggerated the fearful

aspects of the experience. Only 19% of the patients denied any cognitive activity during the clinical procedure, and many of them used non-cognitive coping strategies. Rosensiel and Keefe (1983) observe that most good copers among chronic low back pain patients are typically making conscious efforts to overcome and suppress their pain. They tend to use positive and reassuring self statements and they attempt to reinterpret or ignore their pain sensations. The poor copers (i.e. patients who reported higher pain levels and more impairment in daily functioning) are characterized by their tendency to remain passive and to catastrophize about their current condition and about imminent disasters. Keefe and Dolan (1986) evaluated pain behaviors and coping strategies in CLBP and myofacial pain dysfunction syndrome (MPD) patients. They found that though both groups showed high levels of psychological distress, they differed significantly in their modes of reacting and dealing with their pain. The CLBP patients were less active and more demonstrative in terms of their pain behavior. The researchers attributed the greater maladaptiveness of the CLBP patients to their heavier reliance on coping strategies (such as praying and hoping) which called for external intervention as opposed to the MPD patients who relied more on their own reinforcements.

The studies discussed uphold the importance of cognitive and behavioral coping strategies in attenuation or exacerbation of pain and suffering. The cited studies also point to the potential clinical value of training chronic pain patients to employ cognitive and behavioral techniques in coping with their affliction.

E. Chronic Low Back Pain (CLBP)—Etiology

Pathophysiological Models

The lower lumbar spine bears the burden of enormous stresses. It holds a person upright and returns the body to the vertical position from sitting, lying, or especially from a bent-over position. Numerous etiological factors have been suggested to potentiate CLBP. Generally, although the evidence points out that traumatic injury to the back may result in acute low back pain and massive trauma can cause fracture and dislocation, injury to the back has not been found to be of major importance in the etiology of chronic low back pain. Only 6% to 28% of back pain patients, when asked, can name a specific precipitating event like injury (Horal, 1969; Hult, 1954; Row, 1969; Valfors, 1985). Steinberg (1982) observed over 30 different illnesses and somatic dysfunctions that have low back pain as their final symptomatic expression.

Commonly, degenerative diseases of the spine (including disc hernia, spondylosis, osteoarthritis, transitional vertebrae, and spondylolisthesis) have been considered the primary cause of CLBP. The most often assumed degenerative mechanism is degeneration of the intervertebral disc(s). Progressive degeneration of the intervertebral disc (spondylosis) leads to structural disintegration of the disc with fibrillation of the nucleus, ruptures of the annulus fibrosus, and may cause narrowing of the disc space, osteophyte formation, and narrowing of the spinal canal (stenosis). If protrusion or prolapse of the disc occur (usually due to rupture or bulging of the annulus fibrosus), impingement on the adjacent nerve roots may follow with concomitant pain radiating down the leg (sciatica) and sensory and motor losses. According to Fahrni (1975), in Western societies the process of aging affects fluid content and elasticity of the intervertebral discs;

this may lead to mechanical derangement of the axial joints and secondary degenerative changes which can cause pain because of abnormal stresses upon joints, ligaments, and muscles. Although these processes have been well described and some even demonstrated radiologically, the analysis of forces and vectors has not really led to an understanding of why some people have low back pain and others do not, in spite of the similar pathophysiological states of their backs. Nachemson (1982) reports that all the degenerative processes are also present in individuals without any back pain whatsoever. He concludes, "There are no consistent radiological findings associated with injury of the back that can lead one to the etiological cause of back pain" (p. 60). Research has also failed to demonstrate an unequivocal relationship between degenerative changes in the cervical spine, skeletal joint dysfunction, paravertebral muscle spasm, and low back pain (Hoyt et al., 1981; Kravitz, Moore, & Glaros, 1981; Collins, Cohen, Naliboff, & Schandler, 1982). Magora and Schwartz (1980) found that single disc degeneration occurs even more often in people who have never complained of back pain than in those suffering from it. These findings suggest that abnormal structure or physiology are not unique or significant causes in or maintenance of CLBP. Flor and Turk (1984) report that none of the controlled studies found any relationship between radiologically documented changes of the spine and low back pain. According to Loeser (1982) and Carron (1982), as many as 60% to 78% of patients who suffer low back pain have no apparent physical signs. Despite X-rays and thorough orthopedic examination, there is no evidence of disc disease, arthritis, or any other symptoms that can be considered the cause of pain.

Several studies have demonstrated that congenital or acquired structural spinal abnormalities seem to be unrelated to low back pain (Horal, 1969; Magora & Schwartz, 1980; Torgerson & Dotter, 1976). Muscular or ligamentous dysfunctions have also been implicated in the development of low back pain; however, Evans (1982), Finneson (1980), and Wyke (1980) suggest that muscle spasm and atrophy in low back patients can be viewed rather as a consequence of the pain, the spinal derangements, or postural faults. Fibrositis, described as an inflammation of paravertebral muscle tissue, has often been considered as a pathological entity; but there seems to be no pathoanatomical changes confirming this relationship (Nachemson, 1982). Ligamentous ruptures have been suggested as possible causal factors in back pain (Howes & Isdale, 1971); however, the research evidence does not support this (Nachemsom, 1982).

Certain occupations and strenuous activities, especially those involving heavy manual labor and frequent bending, lifting, and prolonged sitting, have been related to increased incidence of low back pain (Anderson, 1980; Kelsey & Hardy, 1975). The evidence of CLBP as an occupational hazard, however, is not conclusive. Several studies found no relationship among occupation, strenuous activities, and back pain (Hult, 1954; Magora, 1970; Row, 1969). Magora reports that the evidence of back pain correlated best with how physically demanding workers perceived their work to be rather than with how objectively demanding it was. The majority of research on occupation and back pain has involved the identification of high risk groups. Few investigations have been directed at the relationship between pain onset or experience and specific aspects of the work environment. Nagi, Riley, and Newby (1973) found that back pain is associated with increased vocational stress as indicated by frequent job changes. Magora

(1973) concludes that the relationship between prevalence of back problems and occupation appears to be the result of complex interaction between physical and psychological stress. He pointed out that a stressful work environment as perceived by the patient may be more closely related to the incidence of back pain than "objective" factors.

As the research reviewed shows, neither degenerative, nor structural, muscular, or occupational factors seem to have any clearcut relationship to low back pain. They may contribute to back pain, but they do not seem to be sufficient causes for most cases of chronic back pain. Nachemson (1979) summarizes the situation, stating:

> Having been engaged in research in this field for nearly 25 years and having been clinically engaged in back problems for nearly the same period of time, and as a member and scientific advisor to several international back associations, I can only state that for the majority of outpatients, the true cause of low back pain is unknown. . . . Since the cause is unknown, there is only symptomatic treatment available. (pp. 143-145)

Psychological Models

The lack of definitive organic pathology for CLBP has elicited growing attempts to detect psychological determinants and to discern the psychologic process (Crown, 1978). Magora (1973) and Westrin, Hirsch, and Lindegard (1972) suggest that psychological antecedents and consequences may be more closely related to CLBP than the assumed organic factors. Schmidt and Arntz (1987) argue that CLBP should be seen more as a chronic neurosis than as a somatic disease.

Most psychological models focus on a specific psychological process believed to be instrumental in the development or maintenance of CLBP. The first to describe psychological factors in back pain were psychoanalytically oriented

authors in the 1950's and 1960's. Typically, psychoanalysts have described back pain as conversion neurosis. Grace and Graham (1952) describe the typical CLBP patient as having fantasies of running away from stressful situations. They suggest that the inability of the patient to actualize this tendency is presumably converted into chronic back tension and subsequently pain. Holmes and Wolff (1950) report that neurotic patients with back pain showed generalized muscular hyperactivity during movement or during interviews that provoked the expression of conflicts and hostile feelings. Dorpat and Holmes (1962) found increased electromyogram (EMG) activity in the upper and lower back and hamstring muscles in 65 back pain patients as compared to 10 healthy controls. These increases occurred when the patients were asked to perform simple exercises and during psychoanalytic interviews that addressed personal conflicts—especially feelings of hostility, guilt, and frustration. Dorpat and Holmes interpret their findings as indicative of these patients being constantly on guard with quick mobilization of the body musculature during conflicts. These frequent mobilizations, they argue, lead to generalized and sustained muscular hyperfunction, ischemia, and subsequently pain—thus forming the pathogenic basis for CLBP. Levine (1971) suggests a direct link between prolonged antecedent states of depression, physiological stress, alteration in gait and body alignment, and the increased likelihood of low back complication (a degenerated intervertebral disc).

Fordyce (1976), Gentry and Bernal (1977), and Turk, Meichenbaum, and Genest (1983) suggest that socioenvironmental factors contribute to both the development and maintenance of CLBP. Several authors report evidence (based on retrospective reports) that the parents, siblings, and relatives of patients with chronic back problems have substantially higher numbers of pain complaints

than controls, thus supporting the notion of back pain running in families (Gentry, Shows, & Thomas, 1974; Violon & Giurgea, 1984). An epidemiological study of back pain (type and duration unspecified) by Nagi, Riley, and Newby (1973) indicates a higher prevalence in those who had lost a spouse through death, divorce, or separation within the previous year than those who had not been exposed to such stressors. Flor (1982), Turk and Flor (1984), and Flor, Turk, and Birbaumer (1985) propose a comprehensive model that delineates some of the biopsychosocial interactions that may lead to the development of CLBP—a "diathesis-stress" model. The central assumption of the model is that CLBP results from an interaction of environmental events with predisposing organic or psychological conditions (diathesis). The model states that the organic or psychological factors comprising the diathesis may vary for each individual. Factors contributing to this include physical build and health status, as well as psychological conditioning history. The specific physical or psychological events (such as injury, life events) interact with a predisposing diathesis resulting in the complaint of pain. In a weak, already damaged, or otherwise unfavorably predisposed back, a response stereotype (Lacey & Lacey, 1959) may develop, consisting of an extreme and sustained muscular hyperreaction of the back muscles. The increase in muscular tension may lead to ischemia, which causes a reflex muscle spasm in the involved area. Thus, a vicious cycle of pain-muscle tension-pain may develop. Ischemia can also be induced by sympathetic arousal that leads to vasconstriction and will subsequently cause reflex muscle spasm at the affected site. The state of heightened muscle tension and immobility may, in turn, have an additional complicating result of increasing the occurrence of muscle spasms. The entire process may eventually lead to oxygen depletion in the affected muscle tissue

due to sustained contraction, and finally result in muscular degeneration and atrophy. Significant others may also positively reinforce inactivity in an attempt to be sympathetic and to reduce the patient's suffering. This may lead to greater immobility, isolation, and preoccupation with pain.

Feuerstein, Papciack, and Hoon (1985) investigated the etiological role of psychobiological risk factors in CLBP and highlight the possible variables and processes in which CLBP may evolve. They suggest that the reaction to the initial report of symptoms may play an important role in the development of CLBP. The reaction can occur at the individual level in terms of the patient's overt behavioral expression of pain and disability; at the psychological level in terms of subjective levels of anxiety, anger, and frustration; and at the psychophysiological level as a physiological stress response. According to the researchers, a set of complex, interacting mechanisms at the environmental/behavioral, cognitive/perceptual, and psychological/physiological levels are set into action to interact with the reaction variable of the individual. Gentry and Bernal (1977) suggest a process of classical conditioning. They view back pain as an antecedent and reaction to muscular hypertension. They argue that the initial avoidance of movement typical to acute pain may lead to increased immobility which can result in an escalating pain-tension cycle. In time, more and more situations may elicit back pain and anxiety followed by depression and increased dependence on medication which further intensifies the pain-tension cycle.

In summary, neither somatic nor psychological conceptualizations of CLBP have been able to delineate exclusive etiological factors. Therefore, it seems that rather than looking for a single cause of CLBP, CLBP should be viewed as multiple factors achieving etiological significance by their interaction. This

may be especially true for psychosocial variables that may be important potentiators in the transition from an acute to chronic back pain syndrome (Flor & Turk, 1984).

F. Chronic Low Back Pain—Intervention

Overview

The quest for attentuation of CLBP is not a recent phenomena; a recorded reference to remedies for back pain was found in the Ebers papyrus (circa 1550 B.C., cited in Bonica, 1983). Yet, modern-day medical treatment of CLBP is still primarily characterized by a somato-sensory model. It assumes an underlying physiological cause which is viewed as an abnormality in the function or structure of organs and systems. Pain is seen as a mere symptom of and directly proportional to injury and biological disorder, and medical treatment is aimed at providing permanent symptomatic relief by eradicating the underlying pathology. Because physicians are mostly searching for physiological causes for which they can offer a somatic treatment, often little or no consideration is given to the role of psychological or socioenvironmental parameters. Unfortunately, in spite of the advanced knowledge of anatomy and physiology, state-of-the-art technology, and diagnostic procedures, the specific organic causes of most CLBP cases are unknown or cannot be identified. The literature on intervention strategies for CLBP is riddled with inconsistencies of terminology that present much difficulty in the conceptualization and evaluation of different strategies. Fernandez (1986) proposes a trimodal system of chronic pain management: (1) Physical (medical interventions)—The medium of intervention here is in the body, and control is largely external to the subject. Examples of treatments are analgesic medications, surgery, physio-

therapy, and acupuncture; (2) Cognitive strategies—This refers to techniques that influence pain through the medium of one's mind. The cognitive strategies are covert and may be self-initiated. Examples of treatments are imagery, self-statement, and attention diversion; and (3) Behavioral manipulations—This refers to techniques which alter pain through the modification of overt action.

Surgery

Most CLBP patients harbor a mollifying belief that there is always a final way out, the ultimate answer to their pain problems—surgery. Consequently, many try relentlessly to coerce medical professionals into surgery. According to Brody (1982), there are approximately 200,000 spinal surgeries in the United States each year. Unfortunately, surgery can be contraindicated and may actually exacerbate the patient's pain and suffering (Pinsky, 1980). Fine (1986) noted that for approximately 90% of CLBP sufferers, surgery will never be an option. Regardless of the amount of pain or the degree of disability, it is not possible to surgically correct "mechanical" back problems caused by wear and tear at various levels of the spine. In general, other than in extremely rare instances of trauma or removal of a spinal tumor, decompression and stabilization are the only types of operations performed to relieve back pain. However, for either decompression or stabilization surgery to be potentially successful, the back pain patient must be diagnosed with a specific localized condition. The most common decompression operation (discotomy) involves the removal of a herniated disc that is compressing a nerve root. In some instances, when a nerve is compressed by a piece of bone rather than a piece of disc, a laminectomy (to remove the offending piece of bone) will be performed without a discotomy. In approximately 25% of decompression operations, the surgeon stabilizes the area as well

to prevent further physical movement. Loeser (1982) observes that of those CLBP patients who underwent surgery to correct a clear-cut diagnosis of disc herniation, only 60% of them obtained complete relief of low back and related sciatic pain. Hall (1980) explains the meaning of "success" when applied to back surgery:

> ... no back operation can be unconditionally guaranteed, and even if it could your back problems would not necessarily be over for all time. Some disc or joint that never caused trouble before could start hurting next week or next year. In any case, spinal surgery can't really cure a bad back—at least not in the sense that an appendectomy can cure appendicitis.... In fact, the alterations that take place in your spine during surgery may even cause or contribute to new back trouble some time in the future. (p. 178)

Chymopapain

While one group of orthopedic surgeons purport surgical procedure for eligible patients with herniated discs, another group contends that in many cases a chymopapain enzyme injection can dissolve the offending nucleus of a herniated disc and therefore deem surgery unnecessary. According to Sutton, as cited in Fine (1986):

> ... not only are the success rates as good as, or better with chymopapain as compared with traditional surgery, because there is no cutting with chymopapain, there is the added advantage of no scar tissue, which has been known to lead to complications down the road. (p. 125)

Orthopedic Medicine

Orthopedic medicine is defined as the "nonsurgical management of soft tissue disorder of the musculoskeletal system" (Fine, 1986, p. 132). Orthopedic physicians believe that a soft disc condition can be successfully treated with traction, which reduces the stress on the disc and enables it to heal. The hard disc condition, on the other hand, is generally treated with short-term manipulation

to increase the range of motion. When a disc protrudes far enough to produce some amount of neurological deficit (loss of sensation or muscle strength), orthopedic physicians may apply a caudal epidural block injection.

Medication

The first response of most pain sufferers is to seek relief through analgesic medication. Because analgesics can relieve acute pain quickly and effectively, they often lead CLBP patients to see them as the solution to their agony. Almost all CLBP patients have a long history of an ongoing search for the panacea or "magic pill" that will eliminate the pain.

Pharmacological treatment of chronic pain is still clouded with ambivalence. Though a wide variety of chemical compounds and combinations of compounds are already available, choosing a suitable drug, at a dosage to give optimum relief with a minimum of discomfort and danger from side effects, is a difficult task. Unfortunately, repeated intake of medication over a long time potentiates some serious consequences such as tolerance, dependence, and somatic side effects. Tolerance is said to have occurred when the magnitude of the biological action of a drug is reduced following repeated administration of a fixed dose. Thus it requires ever-increasing dosages to provide the same analgesic effect. Physical dependence refers to the situation in which removal of the drug creates discomfort for the patient beyond what can be accounted for by the return of pain. Furthermore, once the body becomes accustomed to having the drug in the blood stream, it starts to crave it—which is the basis of addiction. Paradoxically, as the effectiveness of the analgesic to reduce pain decreases, the side effects loom as do the physiological and psychological dependencies of the user. For many people with CLBP problems, the pain/medication cycle can become a vicious one. Invari-

ably, as pain intensifies, greater dosages of drugs must be taken to offset increased tolerance; consequently, new prescriptions must be added to combat emerging side effects, which leads to confusion and likely adversity of drug crossing.

Aronoff, Wagner, and Spangler (1986) identify five types of drugs frequently used in the treatment of chronic pain:

1. Peripherally acting analgesics such as acetylsalicylic acid (e.g. Aspirin), acetaminophen (e.g. Tylenol), and non-steroidal anti-inflammatory drugs (NSAID) (e.g. Mortin). The peripherally acting analgesics appear to inhibit the synthesis of prostaglandin, a substance that sensitizes free nerve endings. These drugs have not been found to be associated with physical dependencies or addiction; however, gastrointestinal and toxic side effects are possible with excess use.

2. Centrally acting analgesics are narcotics such as codeine (Tylenol 2, 3, 4, or 222, 292), meperidine (Demerol), pentazocine (Talwin), which are either natural or synthetic derivatives of morphine or opium. They act on the central nervous system by binding to opiate receptor sites and activating an endogenous pain modulation system. An unavoidable consequence of long use of centrally acting analgesics is the increased tolerance and side effects such as constipation, nausea, vomiting, sleep disturbance, headaches, dizziness, mental confusion, and depression or elation. Because narcotics can produce euphoria, chronic pain patients may become dependent upon this lift or "high" from the intake of their drugs. Such psychological dependence may compound the withdrawal symptoms.

3. Adjuvant analgesics are drugs such as oxazepam (Serax) and alprazolam (Xanax) which are used to decrease tension, agitation, and insomnia. Although adjuvant analgesics are often prescribed for chronic pain patients, there is little

evidence that they have any direct pain relieving properties. They can also cause physical and psychological dependencies.

4. Antidepressants such as amitriptyline (Elavil), imipramine (Tofranil), and tranylcypromine (Parnate) are commonly prescribed for chronic pain patients whether or not there are evidences of clinical depression. The marked side effects which can occur with prolonged use of these drugs include dry mouth, blurred vision, lethargy, and constipation.

5. Muscular relaxants such as meprobamate (Equavil) and cyclobenzaprine (Flexeril) are prescribed continuously even though the benefits for extended use are questionable. Typical side effects are difficulty with concentration, headaches, dizziness, and drowsiness.

In sum, although analgesics which are the most prescribed drugs for CLBP may be effective in alleviating back pain for brief periods increasing tolerance, the danger of addiction, and often considerable side effects make their prolonged use with CLBP patients problematic. Antidepressant, anti-inflammatory agents and muscle relaxants seem to be of questionable value in treating CLBP and also have side effects. In general, medication that may be useful in acute pain problems is no solution to CLBP.

Chiropractice

The mainstay of chiropractic treatment is manipulation of the spine through an assisted passive motion applied to the spinal facet joints and sacroiliac joints. In some cases, the manipulative "thrust" is thought to stretch contracted muscle, relieving spasm. In other cases, it is thought to break down adhesions which may be restricting the joint's ability to move within its normal physiological range of motion. Most medical doctors advise back patients who are treated

by chiropractor to also consult a medical doctor for a full differential diagnosis. Certain conditions, they explain, can refer pain to the back or down an arm, and they are worried that such symptoms can be mistaken for a musculoskeletal condition by a chiropractor and be mistreated.

Physiotherapy

Once a physician has determined that physical therapy, exercise, better posture, and education are what a back pain patient requires, in most cases he will delegate the patient to a physiotherapist. The physiotherapist's goal is two-fold. It is to assist a patient back to an optimal normal state in terms of function and then to teach that patient self-reliance in maintaining the normal state. To achieve the first part—normal functioning—physiotherapists use a wide roster of treatments. These include massage, heat, ice, TENS, traction, mobilization and, on occasion, manipulation. To achieve the second part of the goal, physiotherapists teach patients anatomy, physiology, proper postural habits, and exercises that take the specific nature of their back problem into account.

Acupuncture

Proponents of the classical approach explain acupuncture as part of a complex theory of medicine in which all diseases are due to an imbalance, or disharmony, between the yin and the yang, the equal and opposite life forces. Acupuncture needles inserted in joints of obstruction where energy and blood supposedly converge are believed to stimulate the body's own regenerative powers. In the 1970's, acupuncture began to be described in Western terms, mostly through Melzack and Wall's (1965) Gate-Control theory of pain. According to the Gate-Control theory, acupuncture needles stimulate the large fibres to the point of overload. At that point, the "gate" that controls the small fibres is shut down

and pain sensations can no longer get through. Though the same theory is often used to explain why techniques such as massage and just plain rubbing often work to alleviate back pain, the beauty of acupuncture is that it is more specific. The stimulation goes directly and precisely to the nerve in question, and the correct pain gate is more likely to shut down. Today the more popular explanation of how acupuncture works is that it stimulates the brain to produce endorphins and enkephalins which are powerful opiates.

As stated, the various physical approaches to CLBP are predominantly symptomatic, aimed at reducing the level of pain and improving mobility. However, because of the somatic obscurity of symptoms—notwithstanding advanced medical knowledge and technology—oftentimes the pain and the functional impairment prevail. This unrelentlessness of refractory low back pain to symptomatic treatment heightens the recognition that CLBP is more than a simple transmission of sensory signals. Bonica (1982) describes the situation very explicitly:

> Effective therapy of acute and chronic low back pain remains one of the most important and pressing issues of American medicine and of the biomedical scientific community. This importance stems from the fact that each year millions of Americans experience acute or chronic low back pain which in many cases requires medical therapy, and annually consumes a disproportionate part of the health care facilities. Unfortunately, in many instances of acute pain and in the majority of those with chronic low back pain, treatment is not effective and the persistent pain causes a progressive physiologic deterioration and serious psychologic, behavioral and sociologic changes. (p. 1)

Cognitive Therapy

The emergent focus on cognitive processes in pain behavior stems from concurrent developments in the fields of personality research and the recognition that behavior is critically affected by the manner in which persons appraise environmental challenges and their ability to meet these challenges. This leads to

the proliferation of cognitive strategies for both intervention and prevention in the illness and pain behavior domains (Bradley & Kay, 1985; Turk, Meichenbaum, & Genest, 1983).

Cognitions have been defined as "a generic term embracing the quality of knowing which includes perceiving, recognizing, conceiving, judging, sensing, reasoning, and imagining" (Stedman's Medical Dictionary, 1976, p. 295). As thinking organisms, humans routinely subject incoming sensory information to extensive cognitive analysis. We draw inferences about the meaning of sensations based on our knowledge of past sensory experience. Unfortunately, humans are limited in their capacity for reasoning and judgement (and may well be prone to misinterpreting pain sensation). As a result, their cognitive schemata may contain erroneous beliefs based on faulty logic or improper inference (Ciccone & Grzesiak, 1984). The cognitive position is that these "mistakes" are causal antecedents of chronic pain, accounting for the patient's self-defeating behaviors, dysfunctional effect, and to some extent impact the frequency and intensity of pain sensations. Genest, Meichenbaum, and Turk (1977) report that subjects identified specific thoughts that were associated with low tolerance for pain. Specifically, they were thoughts that drew attention to aversive characteristics of the task, to the subjects' inadequacy, and to vivid images of physical symptoms (for example, gangrene moving up the arm). The authors characterized these tolerance-reducing thoughts and images as maladaptive and catastrophic.

Cognitive therapy is a broad term, rather loosely defined in the literature, referring to a set of methods designed to modify dysfunctional mental processes and the emotional inferences, premises, and attitudes underlying one's cognitions. Roskies and Lazarus (1980) maintain that how a person psychologically copes

with stressful stimuli depends upon his cognitive view of the situation. This cognitive evaluative view is a dynamic process that changes according to the person's preconceived anticipated consequence of an event, its impact on his well being, and the perceived resources he has available to cope with the threat. According to Sternbach (1984), cognitive therapy is a modern form of mentalism, concerned with modifying the way the patient perceives, interprets, and relates to his pain. In this modality, the elimination of the pain stimulus per se is not viewed as important as learning to cope with it and to master it. The objective of cognitive therapy is to facilitate new thinking skills that explicitly challenge the cognitive attributes of chronic pain. The goal of the successful correction of cognitive error is not achieved when patients develop "insight" into their thinking but rather when they develop a new set of convictions about pain (Ciccone & Grzesiak, 1984).

The use of cognitive coping skills or strategies for pain control has existed probably as long as people have experienced pain (Meichenbaum, 1977), but only recently have such techniques been subjected to controlled, experimental investigations regarding their efficacy for attenuating laboratory as well as clinical pain. Fernandez (1986) grouped cognitive strategies into three broad categories: attention diversion, imagery, and self statements, which are further divided into a total of ten subcategories.

1. Attention diversion deals with redirecting of attention to a non-noxious event or stimulus in the immediate environment in order to achieve distraction from concurrent pain. This ranges on a continuum from (a) passive distraction in a form of passive redirecting of attention from pain to a distractor stimulus such as scenic slides, auditory arousal, or conspicuous "dots"; (b) active attention

diversion which involves a more complex interaction with the distractor, usually in the form of engaging in mental problem solving or competing tasks during pain (counting backwards from 1,000 in steps of 3).

2. Imagery strategies have to do with the production of particular images with pain-attenuating potential. These are comprised of (a) incompatible imagery of events inconsistent with pain, which is subdivided into (i) incompatible emotive imagery designed to elicit emotions (mirth, self-assertion, and humor) inconsistent with pain and which reciprocally inhibit pain, and (ii) incompatible sensory imagery which centers around images of "pure" visual, auditory, or other sensations with no necessary link to particular emotions (imagining a hot day in the desert while undergoing cold pressor pain); and (b) transformative imagery, which assumes the form of (i) contextual transformation in which the context or setting of the pain is altered in imagination (subjects administered forearm ischemic pain imagined themselves as spies shot in the arm and escaping from enemy agents); (ii) stimulus-transformation imagery, where aspects of the situation being transformed are features of the stimulus-producing pain (visualization of abdominal pain as caused by tightening steel bands that could be loosened); (iii) response transformation imagery involving the imagination of response states that usually originate from the noxious stimulation itself but which are dissociable from the ensuing pain (reference to the notion of pain is avoided by relabeling responses to noxious stimulation in terms of numbness, pressure, or pulsations).

3. Self statements aim at altering the patient's "internal dialogue" (Luria, 1961) in order to trigger more adaptive coping behaviors. (a) Coping self statements emphasize the person's ability to withstand pain (e.g. "Relax—just keep it manageable."). (b) Reinterpretive self statements which are aimed at negating

the unpleasant aspects of nociceptive stimulation. This typically incorporates the use of defense mechanisms: (i) denial-oriented self statements may require subjects to deny the harmful and unpleasant features of the pain and even regard it as pleasurable (thinking of radiant heat pain as being pleasurable and the experience as being enjoyable); (ii) rationalization-oriented self statements may require subjects to think of positive or compensatory aspects of the painful experience, like receiving extra care and attention.

Research has generally confirmed the notion that the utilization of cognitive strategies by subjects exposed to experimentally produced pain increases the pain threshold, decreases the reported pain magnitude, and increases pain tolerance (Beers & Karoly, 1979; Chaves & Barber, 1974; Grimm & Kanfer, 1976; Spanos, Brown, Jones, & Horner, 1981). Fernandez and Turk (1985) performed a meta-analysis of 46 laboratory studies and concluded that cognitive strategies influence perception or response to noxious stimulation. Subjects who are trained to use one or more cognitive coping strategies appear to be better off than 80% of those subjects not provided with specific coping strategies. Similar conclusions regarding the efficacy of cognitive strategies are presented by McCaul and Mallot (1984). Cognitive strategies have also been found to be effective in the attenuating of clinical pain. For example, Holroyd, Andrasik, and Westbrook (1977) and Rybstein-Blincher and Grzesiak (1979) found that chronic pain patients taught reinterpretative and attention diversion strategies showed greater attenuation of pain than control subjects.

Behavioral Therapy

When pain is treated as learned behavior, the focus is on the pain behaviors themselves. Behavioral therapies do not have as their principal objective the

modification of nociception or the experience of pain. Rather, behavioral methods in pain treatment programs are intended to reduce the disability and expressions of suffering associated with chronic pain problems. The primary goal is to render chronic pain patients functional again and as normal in behavior as possible and not to decrease pain per se (Roberts, 1981). A patient would be considered to have improved if he displayed a decrease in specifically defined pain behaviors and an increase in the "well" behaviors (Fordyce et al., 1973).

Two major groups of behavior-therapy techniques can be delineated: self-management relaxation techniques, in which the patient is taught to directly alter behaviors; and operant-conditioning methods, in which an attempt is made to change behaviors by modifying their environmental consequences (Keefe, 1982).

1. Relaxation

Relaxation involves a variety of techniques which were designed to achieve a mental and physical state of relaxation. Both common sense and extensive research (Linton & Melin, 1983) suggest that muscular tension, autonomic hyperarousal, and mental confusion exacerbate pain and distress. The most commonly used methods of relaxation are (a) passive relaxation, which involves focusing attention systematically on the sensations of warmth and dissipation of tension in various parts of the body. Verbal suggestions and pleasant images are often used; (b) progressive muscle relaxation, which involves actively tensing and relaxing muscle groups and focusing of attention on the sensations associated with this process; (c) meditation, which involves chanting a word or rehearsing a specific sentence, thereby self-inducing a relaxed state; (d) biofeedback, which is used to train the relaxation of specific chronically tense muscles or chronically aroused

autonomic functions; (e) hypnosis, which involves induction of a state of intensified attention and receptiveness to ideas during which the therapist makes specific relaxation suggestions to the patient; (f) systematic desensitization, which is used for the extinction of anticipatory anxiety that leads to avoidant behaviors. The patient is first trained to relax; then in a deeply relaxed state he is exposed to a systematically increasing approximation of the threatening situation, and eventually to the situation itself.

2. Operant conditioning

The operant conditioning model (Fordyce, 1976; 1978; Fordyce, Fowler, Lehman, & Delateur, 1968; Fordyce, Fowler, Lehman, Delateur, Sand, & Treischman, 1973; Fordyce, Shelton, & Dundare, 1982) is based on the assumption that pain is constituted of observable and quantifiable patterns of behavior. It postulates that pain behaviors obey the "law of effect": that is behaviors that are followed by consequences satisfying to the organism will be repeated while those followed by unpleasant consequences will be discouraged. Pain behaviors therefore can be modified by the manipulation of rewards and punishments.

The goals of the operant conditioning treatment are (a) the extinction of pain behaviors by withdrawal of positive reinforcement (such as attention, medication); (b) the promotion of well behaviors, namely behaviors that are incompatible with pain behaviors (such as exercise, work); and (c) the maintenance of these changes in the patient's natural environment. The operant programs are often conducted on an inpatient basis because this allows for better control of the external contingencies of reinforcement. Spousal participation is usually required, as the spouse is assumed to be the most important reinforcer who can secure transfer of the new behavior patterns to the home environment. Important meth-

ods of reaching the described goals are the withdrawal of attention for pain behaviors and attention and reinforcement for well behaviors. Fordyce et al. (1968, 1973) demonstrate the efficacy of this approach in three patients with chronic back pain. Other researchers report impressive success: Anderson, Cole, Gullickson, Hudgens, and Roberts (1977), Cairns, Thomas, Mooney, and Pace (1976), and Roberts and Reinhardt (1980).

However, there are several limitations to the operant approach. Cairns and Pasino's (1977) study shows that removal of feedback and reinforcement results in a return to baseline levels of activity. Doleys, Crocker, and Patton (1982) suggest a problem with generalization. The fact that operant programs are usually offered on an inpatient basis only makes this approach very expensive and disruptive for employed patients and working spouses.

Cognitive-Behavioral Therapy

The behavioral position and the cognitive position are basically monistic ones. The behaviorists treat pain behavior as the only objective, measurable, and verifiable data while cognition or the experiences of pain are mere epiphenomena. The cognition therapists treat pain as a mental event and behaviors are seen merely as an outward expression of the perception or experience of pain. Although on their own terms cognitive therapy and behavior therapy appear to be quite irreconcilable, the two approaches have been amalgamated into the increasingly popular "cognitive-behavioral" therapy. The goal of cognitive-behavioral therapy is to modify maladaptive cognitions and behavior patterns that may be present in any aspect of the patient's life. The term "maladaptive" refers to cognitions and behaviors which increase rather than minimize the suffering associated with pain. The cognitive-behavioral therapy is conceptually closely

related to Melzack and Wall's (1965) multidimensional Gate-Control model, by emphasizing the interactive and reciprocally determining role of the cognitive, behavioral, and emotional components of pain. In fact, the cognitive-behavioral approach can be viewed as an operational application of Melzack and Casey's (1968) assertion that,

> attacks on pain might well profit by redirecting thinking toward the neglected and almost forgotten contribution of motivational and cognitive processes. Pain can be treated not only by trying to cut down sensory input by anesthetic blocks, surgical interventions and the like but also by influencing the motivational-affective and cognitive factors as well. (p. 435)

Many cognitive-behavioral treatment approaches (termed cognitive behavior modification and cognitive behavior therapy) have been and are widely used as psychotherapeutic interventions for various pain disorders (Meichenbaum, 1977; Kerns, Turk, & Holzman, 1983; Turk, Meichenbaum, & Genest, 1983). The cognitive-behavioral therapeutic interventions attempt to change overt behavior by altering thoughts, interpretations, assumptions, and strategies or respondings (Kazoin, 1978). They are usually highly structured, active, and directive, yet flexible and modifiable in order to promote collaborative efforts (Fishman & Loscalzo, 1987). These interventions combine a set of short-term therapeutic approaches based on both theoretically and empirically derived principles that can be adapted to the specific problems and needs of individual patients. They can be used independently or as adjunctive therapeutic modalities whenever the patient's distress is significant or when behavioral problems such as poor compliance, fear of medical procedures, or disturbed social relations interfere with effective medical management.

According to Holzman, Turk, and Kerns (1986), cognitive-behavioral treatment techniques consist of a whole range of strategies and procedures, both

cognitive and behavioral, designed to bring about alterations in patients' perceptions of their situation and thus their ability to change their condition. The treatment involves educating the patient about a multidimensional view of pain; identifying pain-eliciting and pain-aggravating situations, thoughts, feelings, and behaviors; correcting maladaptive, distorted, and dysfunctional beliefs; and assisting the patient in gaining control over the pain experience (Turk & Flor, 1984; Tan, 1982). Cognitive-behaviorists argue that the increased awareness of events that exacerbate pain and actions that reduce pain can give the chronic pain patient a new sense of control over pain that replaces feelings of anxiety, helplessness, and hopelessness (Rehm & Rokke, 1988). Control as a variable has been shown to be compelling in both laboratory and clinical settings. Thompson (1981) defines control as a belief that a person has at his disposal a response that can influence the aversiveness of an event. He concludes that such belief increases one's tolerance of a noxious stimulus and post-event effects. Weisenberg et al. (1985) demonstrate that the optional level of pain reduction is dependent upon such variables as a person's existing anxiety level and perceived self-efficacy of pain control.

Turk, Meichenbaum, and Genest (1983) propose that the first phase of cognitive-behavioral therapy is helping the patient to define his problems in terms of a framework that makes the problems amenable to solution. The second phase is concerned with actually promoting cognitive, affective, and behavioral change. The third phase is to consolidate the changes, promote generalization, and lay a foundation for maintenance of the changes. Holzman, Turk, and Kerns (1986) suggest that cognitive-behavioral intervention is characterized by its four components: education, skills acquisition, cognitive and behavioral rehearsal, and

generalization. They postulate, however, that these components are not presented sequentially but rather simultaneously and in interaction with one another.

Meichenbaum and Turk (1976), Meichenbaum (1985), and Turk (1978) devised a comprehensive cognitive-behavior intervention program which they termed stress inoculation training. The therapy involves coping skills, training, and problem-solving strategies. Central to the therapy is the concept of the client's "recognition" or "awareness" of his behavior. The focus of the therapy is changing the client's "internal dialogue," a term coined by Luria (1961) as a pregnant construct that refers to attention, appraisal, affect, physiological responses, and initiation of behavior. According to Meichenbaum and Turk (1976),

> rarely does the client consider the role of his own thinking processes and/or the interpersonal meaning of his own behavior as sources of disturbance.... I am proposing that behavior change occurs through a sequence of mediation processes involving the interaction of inner speech, cognitive structures, and behavior and their resultant outcomes. If an individual is going to change his pattern of responding, he must introduce an intentional mediational process. The mediation process involves the recognition of maladaptive behavior (either external or internal) and this recognition must come to elicit inner speech that is different in content from that engaged in the prior therapy. The altered private speech must then trigger coping behavior. (pp. 217-218)

According to Peterson (1982), the cognitive-behavioral approach attempts to assist the chronic pain patient in ameliorating the problem at the level of pain perception, suffering, and pain behavior. Generally, the cognitive-behavioral treatment relies heavily on active patient participation, as it teaches the patient a range of coping skills to assist him in dealing with maladaptive thoughts and feelings as well as noxious sensations that may facilitate or exacerbate suffering. Throughout the therapy, the therapist encourages the patient to feel like an active contributor to his or her pain experience and not a helpless, hopeless victim.

The responsibility for carrying out the program and maintaining any treatment gains rest ultimately with the patient. From the cognitive-behavioral perspective, therapeutic gain is enhanced when the patient is actively involved and accepts responsibility for changes (Schorr & Rodin, 1982).

Overall, the cognitive-behavioral therapy for CLBP has the advantage that it can teach patients how to cope more effectively with their pain, even if they cannot get rid of it completely. It can be applied easily in a group and outpatient setting and is therefore more cost-effective than any inpatient treatment. It is readily adjunctive with other treatment modalities (Chapman, Brena, & Bradford, 1981; Turk, Meichenbaum, & Genest, 1983). It is non-invasive, improves the probability of generalization of treatment gains, and it deals with related problems that arise in the patient's natural environment.

A number of studies have examined and demonstrated the efficacy of the cognitive-behavioral approach with different clinical pain populations: headaches (Holroyd, Andrasik, & Westbrook, 1977; Bakal, Demjean, & Kaganov, 1981; Figueroa, 1982); arthritis (Randich, 1982); temporomandibular joint pain (Stenn, Mother-sill, & Brooker, 1979); low back pain (Gottleib et al., 1977; Gottleib, Alperson, Koller, & Hockersmith, 1979; Redden & Braddon, 1980; Turk & Flor, 1984; Turner and Clancy, 1986); prepared childbirth (Melzack, 1984); and debredement of burns (Wernick, Taylor, & Jaremko, 1981). Generally, the results suggest that relaxation, anxiety reduction, desensitization, attention distraction, and imagery are effective modalities of pain control. Some authors, however, are more cautious about the utility of the reported results. Weisenberg (1984) and Pearce (1983) have reviewed cognitive-behavioral approaches to chronic pain and categorized them as being either "pain directed" (restructuring or distraction) or "stress directed"

(relaxation). According to Pearce, there were not enough substantial data to draw firm conclusions concerning the utility of the cognitive aspects of the stress-directed techniques and only minimal support for the value of pain-directed techniques. Tan (1982), Turk, Meichenbaum, and Genest (1983), and Turner and Chapman (1982) conclude that because many studies have been laden with methodological deficiencies, the results have been equivocal.

G. Conclusions from the Literature

From the literature surveyed and reviewed, it is evident that neither somatic nor psychological conceptualizations of CLBP have been able to delineate isolated or conclusive etiological factors. However, it appears that many physiological, psychological, and social attributes are inextricably intertwined in the genèsis and perpetuation of the chronic pain syndrome. Aside from the tormenting pain sensations, chronic pain sufferers also reportedly manifest heightened levels of emotional distress which clearly contribute to their handicap. It seems that individual differences in perceptual control over the painful stimuli and in reaction (coping) to them are major contributors to the severity of the emotional distress. Emotion is intimately connected to the cognitive process of situational appraisal. This view of emotion sees affects as integral features of the information-processing and coping capabilities of the organism. In other words, emotions are generated in the organism by subjective evaluation of current condition and foreseen consequences. The cognitive-behavioral approach seems to have high face-validity in its applicability to altering the chronic pain patient's negative appraisal of the present situation and its adverse consequences. Yet although cognitive-behavioral interventions were used with a wide range of chronic pain symptoms, the purported positive results often lack sufficient empirical evidence and therefore

must be taken as tentative and equivocal. Far more comprehensive and carefully designed studies are needed before firmer conclusions can be reached regarding the utility of cognitive-behavioral intervention with chronic pain patients in general and CLBP patients in particular.

H. Formulation of the Study

This study attempts to research the extent of pain suffering and emotional distress among CLBP patients and their relation to the patients' habitual coping strategies and locus of control beliefs. In addition, the study evaluates the efficacy of cognitive-behavioral therapy in attenuating pain and emotional distress, modifying locus of control beliefs, and expediting more adaptive coping strategies in CLBP patients. In the design of the study, efforts were made to rectify some of the shortcomings identified in previous studies.

The following explains some of the limitations of the reported studies and how this present research attempts to overcome them. (1) Only a few studies have employed homogeneous clinical populations and adequate control conditions. This study focuses on CLBP patients only and it incorporates comparisons between CLBP patients and no-pain subjects as well as between two subgroups of CLBP patients—one that received treatment and one that did not. (2) In many studies measurements were made with instruments that were not specifically developed for pain patients. This study utilizes extensive standardized and quantified assessment tools which were either designed for or proved to be akin to CLBP patients. (3) Many of the studies that have reported on the efficacy of cognitive-behavioral treatment used isolated intervention variables or were lacking a clear, structured approach. This study employs a clearly detailed structured treatment program which was applied in a uniform fashion to all treatment subjects. (4) Although

reportedly focused on modification of maladaptive thinking and coping, only a few studies tested directly whether cognition and behaviors were actually altered as a result of treatment. Changes were usually inferred rather than directly tested. This study assesses treatment effects on coping strategies as well as on pain, emotional distress, and perceived control. (5) The study also appraises participants' evaluation of the treatment to ascertain their views and suggestions.

It is hoped that this study can lend useful information to educators and practicing health care clinicians.

I. Hypotheses

Following are the main hypotheses derived from the literature reviewed:

1. CLBP patients will use more and heightened pain descriptors than No-Pain subjects to rate the sensory, affect, and evaluative components of their pain. They will also grade more severely the intensity of their pain.

2. CLBP patients will report greater utilization of maladaptive coping strategies (such as catastrophizing and exhibiting pain behaviors) and less use of adaptive coping strategies (such as diverting attention, using coping self statements, and ignoring sensations) relative to No-Pain subjects. In addition, CLBP patients will believe less in their ability to control and decrease pain.

3. CLBP patients will express more external health locus of control beliefs (powerful others and chance) and fewer internal beliefs than No-Pain subjects.

4. CLBP patients will report elevated levels of hypochondriasis, depression, interpersonal problems, anxiety, social introversion, and self-depreciation.

5. Cognitive-behavioral therapy is an effective intervention in attenuating CLBP patients' pain. There will be significant reduction in post-treatment measures of pain intensity and in the pain's sensory, affect, and evaluative components.

6. Cognitive-behavioral therapy is an effective intervention in teaching CLBP patients to substitute maladaptive coping strategies with more adaptive ones. Treatment patients will increase significantly the use of diverting attention, reinterpreting and ignoring pain sensation, coping self statements, and increased activities. They will also indicate significant reduction in catastrophizing. Treatment patients will express stronger belief in their ability to control and reduce pain.

7. Cognitive-behavioral therapy is an effective intervention in accentuating internal locus of control beliefs in CLBP patients. Treatment patients will record a significant increase in the internal and decrease in the external (powerful others and chance) locus of control beliefs.

8. Cognitive-behavioral therapy is an effective intervention in alleviating emotional distress in CLBP patients. Treatment patients will report a significant decrement in measures of hypochondriasis, depression, interpersonal problems, anxiety, social introversion, and self-depreciation.

9. Treatment patients will appraise the cognitive-behavioral therapy as useful and helpful.

In the next chapter, the methodology that was applied to investigate these hypotheses is discussed.

III. METHODOLOGY

The study consisted of two separate parts in accordance with the research hypothesis stated in Chapter II. The first part focused on comparisons between chronic low back pain (CLBP) patients (Treatment and No Treatment) and No-Pain subjects across diverse variables. The second part evaluated the efficacy of cognitive-behavioral therapy in reducing pain, emotional distress, and in facilitating adaptive changes. The method employed and the analysis will be described in this chapter.

A. Subjects

One hundred and forty subjects participated in the study. Forty chronic low back pain (CLBP) patients were recruited to the study through the cooperating offices of three orthopedic surgeons, four general practitioners, and two anesthesiologists operating a pain clinic at a university hospital. Following are the inclusion criteria for CLBP patients: volunteers, ambulatory outpatients diagnosed with CLBP for at least six months, either sex, ages 18-65, under no concomitant psychological treatment, and able to read and follow written instructions in English. Sixty-four eligible CLBP patients who came for medical consultation were given by the above physicians a pre-stamped, addressed envelope which contained an Information Sheet (Appendix A), Consent Form (Appendix B), and five questionnaires. Forty CLBP patients returned the completed questionnaires with a signed consent form. Eighteen CLBP patients who indicated interest in the optional therapy were assigned to a Treatment group (CLBP-T). All 18 CLBP-T patients attended the six therapy sessions and completed the follow-up post-treatment questionnaires. Nineteen CLBP patients who opted for the questionnaire only,

and an additional three patients who were excluded from therapy because they were Workers' Compensation Board (WCB) recipients, formed the CLBP No Treatment (CLBP-NT) group.

The 100 No-Pain subjects consisted of visitors to a university hospital, hospital staff, provincial government employees, public school board personnel, self-employed people, and retirees. Following are the inclusion criteria for the No-Pain group: volunteers, either sex, ages 18-65, no known chronic pain problems, no known long-term or terminal disease, and able to read and follow written instructions in English. One hundred and thirty-two eligible No-Pain subjects were given a pre-stamped, addressed envelope which contained an Explanation Sheet (Appendix A_1), and five questionnaires. One hundred No-Pain subjects who returned the completed questionnaires formed the No-Pain group.

B. Design

The 140 subjects composed three groups: (1) 18 CLBP-T patients who underwent cognitive-behavioral treatment consisting of six group sessions, (2) 22 CLBP-NT patients who did not receive the cognitive-behavioral treatment, and (3) 100 No-Pain subjects. All three groups were pretested on the dependent variables, and means and frequencies of pretest scores were computed. For the comparison among the three groups, data collected were analyzed using standard descriptive statistics, MANOVA and ANOVA. The efficacy of the treatment was discerned by analyzing within-subject changes on repeated measures (CLBP-T (Pre)/CLBP-T (Post)) and between-subject changes (CLBP-T (Post)/CLBP-NT). Tests of significance were employed to determine whether the differences in the scores were large enough to reject the null hypothesis that they might have occurred by chance. For correlational analysis, Pearson Product Moment Correlation Coefficients were computed across variables.

C. Procedure

All subjects completed the battery of five questionnaires and returned them by mail to the author. CLBP patients also enclosed a signed consent form in which they indicated whether they were interested in completing the questionnaires only or also in participating in the optional cognitive-behavioral treatment.

Upon receiving a complete set of questionnaires, the author sorted out the three groups (No-Pain, CLBP-T, CLBP-NT). The 18 CLBP-T patients who elected to participate in the treatment (and who were not WCB recipients) were contacted by the author and scheduled to commence group therapy within three weeks. Three successive treatment (therapy) groups were formed; each consisted of five females and one male. All groups' therapy sessions were conducted by the author, who was the only therapist, and were held in the Division of Clinical Psychology, University of Alberta Hospital. At the end of the group sessions, CLBP-T patients were asked to complete an anonymous Participant Evaluation form (Appendix G). One month following the last therapy session, the author mailed to CLBP-T patients another set of four questionnaires (MPQ, CSQ, MHLC, BPI) with instructions to complete and return them in the provided pre-stamped, self-addressed envelope. All 18 CLBP-T patients completed the Self-Evaluation Form and all of them returned the completed post follow-up questionnaires approximately two months after leaving therapy.

D. Assessment Measures

All the assessment measures were self-administered.

Background Information Questionnaire (Appendix C)

This is a seven-item, general information questionnaire which inquired about the patient's sex, age, cause and duration of back pain, education, occupa-

tional status, and disability payments. A shorter four-item version was prepared for the No-Pain subjects (Appendix C_1).

The McGill Pain Questionnaire (Appendix D)

The McGill Pain Questionnaire (MPQ) (Melzack, 1975) was designed to provide quantitative measures of the three interrelated but conceptually distinct components of pain: sensory-discriminative, motivational-affective, and cognitive-evaluative. It utilizes 20 sets of verbal pain descriptors, with each set containing up to six words in an empirically determined ascending order of pain intensity. The MPQ provides three types of data: (1) pain rating indices based on the rank values of the words for the different dimensions of pain—Sensory, Affective, Evaluative, and Miscellaneous; (2) the number of words chosen; and (3) the index of present Pain Intensity (for a more detailed description of the MPQ measures and its construct validity, see pages 25-26). A modified version with slight variations in the instructions was prepared for the No-Pain subjects (Appendix D_1).

Coping Strategies Questionnaire (Appendix E)

The Coping Strategies Questionnaire (CSQ) (Rosensiel & Keefe, 1983) was developed to measure the extent to which CLBP patients initiate cognitive and behavioral coping strategies in dealing with their pain. The CSQ consists of 48 items describing different response modes, and the subject is asked to indicate on a 7-point Likert scale how often (1 = never, 7 = frequently) he responds in such a fashion when experiencing pain. Every six items encompass different coping strategies. The items and the coping strategies assessed in the CSQ were selected on the basis of a review of relevant laboratory and clinical studies. The CSQ provides composite scores for six cognitive coping strategies (Diverting

Attention, Reinterpreting Pain, Coping Self Statements, Ignoring Pain, Praying or Hoping, and Catastrophizing) and two behavioral coping strategies (Increasing Activity and Increasing Pain Behavior). At the end of the questionnaire, the subject is asked to rate how much control he feels he has over pain and how much he thinks he is able to decrease pain.

Research has found that the coping strategies measured by the CSQ are predictive of pain, psychological function, activity level, and physical impairment in CLBP patients (Gross, 1986; Rosensiel & Keefe, 1983; Turner & Clancy, 1986). A modified version with slight variation in the instructions was prepared for the No-Pain subjects (Appendix E_1).

Multidimensional Health Locus of Control Questionnaire (Appendix F)

The Multidimensional Health Locus of Control Questionnaire (MHLC) (Wallston, Wallston, & Devellis, 1978) contains 18 statements which yield scores on three dimensions: (1) Internal Health Locus of Control Scale measures the extent to which a person believes that health is a function of his actions; (2) Powerful Others Health Locus of Control Scale measures the degree to which a person believes that his health is largely determined by the actions of others such as family members, friends, or health professionals; (3) Chance Health Locus of Control Scale measures the degree to which a person believes that his health is a matter of fate, luck, or chance. The MHLC is the most validated and widely used measurement of health locus of control to date (Hartke & Kunce, 1982).

Basic Personality Inventory

The Basic Personality Inventory (BPI) (Jackson, 1989) was designed to appraise a number of broad facets of personality and to identify areas of personal maladjustment and psychopathologies within the normal population and persons

experiencing psychological distress. Its development incorporated modern scale construction and evaluation methods. The BPI is a 12-scale, 240 true-false item inventory. The BPI scales can be organized into six broad categories: Measures of Inadequate or Deviant Socialization: Interpersonal Problems, Alienation, Impulse Expression; Measures of Mood and Personal/Emotional Adjustment: Depression, Anxiety, Hypochondriasis; Measures of Cognitive Functioning: Persecutory Ideas, Thinking Disorder; Measures of Self Perception and Sociability: Self Depreciation, Social Introversion; Measure of Critical Deviant Behavior: Deviation; and Measures of Insight and Openness: Denial. Given the bipolar nature of the scales' definitions, it is possible to infer from the BPI results areas of personal strength and normal personality functioning. Thus, scale definitions indicate characteristics of both high- and low-scoring individuals. The BPI has been used to investigate psychological correlates of individuals who suffer from various medical conditions such as chronic renal failure (Burton, Kline, Lindsay, & Heidenheim, 1986), dialysis (Richmond, Lindsay, Burton, Conley, & Wai, 1982), and fibrositis (Scudds, Rollman, Harth, & McCain, 1987). No study has yet been published about the utility of this instrument with CLBP patients.

Participant Evaluation Form (Appendix G)

The evaluation form consists of 10 statements pertaining to the merit of the treatment and the usefulness of the therapist. The subjects were asked to circle their response on a 7-point Likert scale (1 = strongly disagree, 7 = strongly agree). Subjects were also asked to comment about the program and offer suggestions for improvement.

E. Treatment

Conceptual Framework

The underlying operational precepts of the treatment program were directly derived from the multidimensional Gate-Control model (Melzack & Wall, 1965; 1982) in utilizing the inhibitory influences that cognitive, emotional, and behavioral factors can have upon pain experience. The six-session structured program was patterned after that of Corey (1988), Philips (1988) and Turk, Meichenbaum, and Genest (1983). It was designed to enhance the patients' awareness of the global effects that chronic low back pain wields over their lives and to teach them how to modulate its impact and how to minimize and attenuate their suffering and disability by facilitating changes in their pain behaviors, cognitions, and emotional reactions. Patients were encouraged to reconstruct the meaning of their pain and engage in more self-efficacious coping strategies and behaviors aimed at maximizing their self-control over episodes of pain and the associated ensuing emotions.

Structure

The treatment consisted of six weekly, 90-minute group therapy sessions. A group therapy modality was chosen because of the advantages in bringing subjects with similar symptoms into contact with each other and helping them to gain a sense of proportion with respect to their problems, dilemmas, and distress. The frequency of the sessions (once a week for six consecutive weeks) allowed sufficient time for the participants to practice and assimilate the new skills in their own natural environment. Each session involved a discussion of the homework assignment from the previous week, a short didactic presentation, demonstra-

tion and practice by patients of skills specifically related to the didactic discussion, and assignment of homework tasks utilizing the suggested skills.

Sessions' Outline

The outline highlights in summary form the objectives and the content of the sessions. Transcripts of the didactic part and the homework assignments of each session are provided in the Appendix section (Appendix J to Appendix X).

Session #1: Reconceptualization of Pain (Appendix H)

Common misconceptions associated with pain were discussed and the patients were introduced to the notion that pain is not solely a medical symptom but rather a complex, multifaceted process which they could influence and change. The Gate-Control theory was presented to demonstrate the multidimensional aspects of pain. Since the aim of the session was not to impart precise scientific information but rather to provide the rational basis for the specific interventions that follow from the Gate-Control model, it was presented not as a perplexing scientific tenet but as a simple explanation of "how pain works" (Appendices J and K). The patients were given an explanation, using personally relevant examples, of how changing one's cognition (attitude, beliefs, thoughts, and expectations), emotions, and behaviors can influence "opening" and "closing" the gate and thereby exacerbate or inhibit the pain and suffering. For the homework assignment, subjects were asked to keep an hourly pain intensity chart (Appendix L) for the following week and to prepare a list of observable and measurable treatment goals (Appendix M).

Session #2: (a) Deep Breathing (Appendix N)

(b) Daily Activity (Appendix O)

In the first part of the session, patients were told how breathing is a reflection and trigger of physiological state and sense of wellness. Patients were then instructed in deep, slow, rhythmic breathing techniques. In the second part of the session, it was explained that characteristically CLBP patients tend to remain inactive to avoid pain, with occasional bouts of frenzy. Ironically, inactivity and sporadic attacks only worsen the condition. The method suggested for safely resuming activities involves (1) establishing base lines; (2) shaping, gradually and systematically increasing the amount of activity; and (3) pacing, controlling activities based upon current abilities. For the homework assignment, subjects were asked to practice the deep, slow breaths in sequences of four each time. They were also instructed to prepare each evening a schedule of activities and exercises for the following day (Appendix P). The day was to be broken into manageable time slots with designated activities based on their established baselines.

Session #3: Relaxation (Appendix Q)

Relaxation at will, it was explained, is one of the most potent ways to break the vicious pain irritant-tension-anxiety-increased pain circle. Relaxation helps control muscular tension and it creates feelings of emotional calmness which close the pain gate (in contrast to tension and anxiety which open it). The principles of progressive muscle relaxation were explained and practiced. In the second part of the session, a physiotherapist joined the group and (1) discussed the merits of fitness and the usefulness of walking, swimming, and bicycling for CLBP patients; and (2) instructed the patients in low-impact stretch exercises.

For the homework assignment, patients were given a pre-recorded audio tape of progressive muscle relaxation. Side One—Active (Appendix R) involves systematically tightening and releasing different muscle groups. Side Two—Passive (Appendix S) is the same without the intentional tightening of muscles. The scripts were composed by the author based on Jacobson's (1974) principles. Patients were instructed to listen to either side of the tape twice a day and keep a record (Appendix T).

Session #4: Attention Diversion (Appendix U)

Patients learned how awareness of and attention to the pain triggering opening of the "gate" maximized the pain sensation. Patients were shown how awareness and attention heightens painful sensations. It was also demonstrated how focusing on one part of the body obliterated the sensations in other parts and how talking, ruminating, and worrying about the pain are all acts to focus the attention on the pain and consequently triggering the opening of the "gate" and maximizing the pain sensations. Patients were instructed how to utilize a wide assortment of attention diversion techniques to decrease their pain level. For the homework assignment, patients were instructed to experiment with the different techniques at lower levels of pain and to continue practicing the ones that worked best for them against higher levels of pain as they became more skilled.

Session #5: Imagery (Appendix V)

Imagery, it was explained, can affect the body's physiological functioning and emotional reactions and as such can be a potent tool in relieving pain. It was demonstrated how imagery involves visualizing and focusing on events or scenes that are completely absorbing and how the more senses one can bring

into play, the more vivid and engrossing the image becomes and the pain lessens. For the homework assignment, the patients were instructed to experiment with different imagery techniques in conjunction with relaxation, to sort out the images that were most appealing to them, and to keep practicing.

Session #6: Self Talk (Appendix W)

Patients learned the adverse impact of negative self talk and how it influences one's cognition, emotion, and perception of pain. Different techniques were suggested and demonstrated about how to identify negative self talk, how to stop it, and how to replace it with positive, reinforcing, self-controlled self talk. For the homework assignment, patients were asked to monitor their self talk, keep a record of their negative monologues, and to counterbalance them with positive statements.

At the end of the session it was emphasized that the responsibility for maintaining any treatment gains rested with the individual patient and were contingent upon continuing practice (Appendix X).

F. Statistical Analysis

Initial analysis involved deriving descriptive data for the three groups: No-Pain, CLBP-T, and CLBP-NT. Each group was described by means and standard deviation with respect to age and duration of pain; cause of pain, education, employment status, and disability payments were presented as percentage frequencies. In accordance with the endeavor of this research to assess the degree to which people who suffer from chronic low back pain are different from No-Pain subjects and their susceptibility to change on various dependent measures, statistical analyses were done in a systematic fashion. The evaluation focused on variables which, consistent with the research questions, are believed to be modifi-

able as a result of participating in a cognitive-behavioral psychological treatment program.

To determine if there were differences between the three subject groups, a one-way multivariate analysis of variance (MANOVA) was carried out for each dependent measure (MPQ, CSQ, MHLC, BPI).

Following the establishment of significant MANOVA, a univariate analysis of variance (ANOVA) was carried out for each separate subscale. F-ratio was used to determine differences between dependent variables and Scheffe multiple comparison test to discern differences between subject groups. Pearson Product Moment Correlations were also calculated to examine the relationships between the dependent measures. To evaluate the treatment effect, the mean differences between post-treatment and pre-treatment were computed and analyzed as well as the individual subject's changes. One way analyses of variance (ANOVA), within and between subject groups, were executed to affirm treatment effect.

Computation for all analyses utilized the SPSSX (1986) statistical software package. A difference was deemed significant if it could happen by chance no more than 5 out of 100 times.

The following chapter will present the results of the data analyses.

IV. RESULTS

The chapter begins with demographic and descriptive information, followed by statistical analyses related to the research questions.

A. Demographic and Descriptive Data

Table 1 summarizes the pertaining information. The means, frequencies (%), and standard deviations for the No-Pain, CLBP-NT, and CLBP-T groups are presented. The majority of the subjects were females (74%, 68%, 83% in the No-Pain, CLBP-NT, and CLBP-T groups respectively). The average age was 37 years for the No-Pain group, 43 for the CLBP-NT group, and 45 for the CLBP-T group. The mean length of pain was nine years for both CLBP-NT and CLBP-T groups. The indicated cause of pain was mainly injury (68% CLBP-NT, 55% CLBP-T). Of the No-Pain group, 66% reported full-time employment compared to CLBP-NT 40% and CLBP-T 22%. The majority of the CLBP subjects received no disability payments (CLBP-NT 77%, CLBP-T 72%).

To determine the degree to which the No-Pain, CLBP-NT, and CLBP-T groups were similar or different, the means, standard deviations, and frequencies of each demographic variable were compared. Frequency distributions have been tested by using chi-square, and differences between means have been tested by using student t-test. No significant differences were found between the CLBP-T and CLBP-NT group on any of the demographic and descriptive variables. The No-Pain group was found to be younger, more educated, and more employable than the two CLBP patient groups.

Table 1. Demographic Information, Frequencies, Means, Standard Deviation, and Percentages
No-Pain Subjects (No-Pain), Chronic Low Back Pain Patients--No Treatment (CLBP-NT), Chronic Low Back Pain Patients--Treatment (CLBP-T)

	No-pain (N = 100)	CLBP-NT (N = 22)	CLBP-T (N = 18)
Sex			
Males	26 (26.0%)	7 (31.8%)	3 (16.7%)
Females	74 (74.0%)	15 (68.2%)	15 (83.3%)
Age			
Mean years (S.D.)	37.05 (8.69)	43.31 (12.98)	45.50 (12.15)
Length of pain			
Mean years (S.D.)	N/A	9.04 (6.40)	9.26 (7.94)
Cause of CLBP			
Injury	N/A	15 (68.2%)	10 (55.6%)
Illness	N/A	1 (4.5%)	1 (5.6%)
Operation	N/A	-	-
Unknown	N/A	6 (27.3%)	7 (38.9%)
Other	N/A	-	-
Employment status			
Full time	66 (66.0%)	9 (40.9%)	4 (22.2%)
Part time	14 (14.0%)	2 (9.1%)	2 (11.1%)
Homemaker	7 (7.0%)	3 (13.6%)	2 (11.1%)
Self-employed	6 (6.0%)	1 (4.5%)	-
Sick leave	-	1 (4.5%)	2 (11.1%)
Unemployed	3 (3.0%)	3 (13.6%)	3 (16.7%)
Retired	2 (2.0%)	3 (13.6%)	5 (27.8%)
Other	2 (2.0%)	-	-
Disability payment			
None	N/A	16 (72.7%)	14 (77.8%)
Pending litigation	N/A	-	1 (5.6%)
Workers' Compensation	N/A	5 (22.7%)	-
Canada Pension	N/A	1 (4.5%)	2 (11.1%)
Other	N/A	-	1 (5.6%)
Education			
Grade 8 or less	-	-	-
9-11 grades	5 (5.0%)	5 (22.7%)	5 (33.3%)
12-13 grades	15 (15.0%)	3 (13.6%)	1 (5.6%)
Vocational, technical, college	19 (19.0%)	6 (27.3%)	3 (16.7%)
Partial university	16 (16.0%)	3 (13.6%)	4 (22.2%)
University degree	32 (32.0%)	3 (13.6%)	4 (22.2%)
Advanced university degree	13 (13.0%)	2 (9.1%)	-
Other	-	-	-

B. Contrast Analysis

The three research subject groups (No-Pain, CLBP-NT, CLBP-T (Pre)) were compared on each of the dependent variables to determine if they differed and on what measures.

Pain

Table 2 presents the means and standard deviations of the three subject groups across the McGill Pain Questionnaire's subscales, which are Pain Sensory, Pain Affective, Pain Evaluative, Pain Miscellaneous, Number of Words Chosen, and Pain Intensity.

A one-way Multivariate Analysis of Variance (MANOVA) was carried out to investigate the overall effect among the three groups on the McGill Pain Questionnaire subscales. The groups were found to be significantly different (Wilk's Lambda $F=18.15$, $p=.00$), and therefore it was considered justifiable to proceed and test each separate dependent variable with one-tailed Univariate Analysis of Variance (ANOVA). Table 3 summarizes the ANOVA's carried out on all the McGill Pain Questionnaire's subscales. Of the six ANOVA's, only the Pain Intensity was found to be significant at $p < .05$.

To determine which of the subject groups were different, the Scheffe multiple comparison test was conducted. The results show no significant differences between the CLBP-NT and the CLBP-T (pre) groups on any of the McGill Pain Questionnaire's subscales. This supports the assumption of equality between the CLBP patient groups on all the pain dimensions. The results also support the hypothesis of significant differences in direction between CLBP patients and No-Pain subjects in their reported pain intensity. The results, however, did not support the hypothesis that CLBP sufferers will be different from No-Pain

Table 2. McGill Pain Questionnaire Table of Means and Standard Deviations
No-Pain Subjects (No-Pain), Chronic Low Back Pain Patients—No Treatment (CLBP-NT), Chronic Low Back Pain Patients—Treatment (Pre) (CLBP-T (Pre)

Variables	No-Pain (100)	CLBP-NT (22)	CLBP-T (Pre) (18)
Pain--Sensory	20.30	17.82	18.83
	(9.33)	(6.94)	(6.84)
Pain--Affective	4.30	3.23	4.33
	(3.43)	(2.78)	(2.87)
Pain--Evaluative	3.15	2.82	2.89
	(1.55)	(1.26)	(1.40)
Pain--Miscellaneous	6.43	6.00	5.67
	(4.66)	(3.15)	(2.59)
Number of Words	12.47	12.95	13.50
	(5.41)	(4.42)	(4.00)
Pain Intensity	.34	2.91	2.83
	(.71)	(1.02)	(.79)

Table 3. McGill Pain Questionnaire Univariate Analysis of Variance
No-Pain Subjects, Chronic Low Back Pain Patients—No Treatment, Chronic Low Back Pain Patients—Treatment (Pre)

Variable	MS Hypotheses	MS Errors	F-Ratio	Prob.
Pain--Sensory	0.64	0.76	0.84	0.43
Pain--Affective	0.43	0.43	1.01	0.36
Pain--Evaluative	1.31	2.23	0.59	0.55
Pain--Miscellaneous	0.33	1.13	0.30	0.74
Number of Words	9.09	26.12	0.35	0.70
Pain Intensity	91.83	0.60	152.02	0.00

One-tailed, DF = 2,137

subjects in their rating of the sensory, affective, and evaluative dimensions of pain. No significant differences were found in any of these dimensions.

Coping Strategies

Table 4 presents the means and standard deviations of the three groups across the Coping Strategies Questionnaire subscales. These subscales are Diverting Attention, Reinterpreting Pain, Coping Self Statements, Ignoring Pain, Praying or Hoping, Catastrophizing, Increased Activities, Pain Behaviors, Ability to Control Pain, and Ability to Decrease Pain.

A one-way Multivariate Analysis of Variance (MANOVA) was carried out to investigate the overall effect among the three groups on the Coping Strategies Questionnaire's subscales. The groups were found to be significantly different (Wilk's Lambda $F=8.81$, $p=.00$).

Table 5 summarizes the one-tailed ANOVA's which were carried out on the Coping Strategies Questionnaire's subscales. Significance was noted on six variables: Reinterpreting Pain, Coping Self Statements, Praying or Hoping, Catastrophizing, Increased Activities, Ability to Control Pain, and Ability to Decrease Pain.

To determine which of the groups were different, the Scheffe multiple comparison test was conducted. The results show no significant differences between the CLBP-NT and the CLBP-T (Pre) groups on any of the variables. This supports the assumption of equality between the patient groups on all the Coping Strategies Questionnaire's subscales. Both CLBP-NT and CLBP-T (Pre) groups reported utilizing more Catastrophizing and less Coping Self Statement strategies than No-Pain subjects. The two patient groups also indicated significantly less confidence in their ability to control and decrease pain. In addition,

Table 4. Coping Strategies Questionnaire Table of Means and Standard Deviations
No-Pain Subjects (No-Pain), Chronic Low Back Pain Patients—No Treatment (CLBP-NT), Chronic Low Back Pain Patients—Treatment (Pre) (CLBP-T (Pre))

Variable	No-Pain (100)	CLBP-NT (22)	CLBP-T (Pre) (18)
Diverting Attention	3.30	3.49	2.95
	(1.33)	(1.48)	(1.45)
Reinterpreting Pain Sensation	2.33	1.64	1.79
	(1.24)	(0.67)	(0.83)
Coping Self Statements	4.65	3.58	3.36
	(1.10)	(0.79)	(1.24)
Ignoring Pain	3.69	3.47	3.56
	(1.32)	(1.14)	(1.33)
Praying or Hoping	2.93	3.93	3.99
	(1.34)	(1.72)	(1.69)
Catastrophizing	2.21	4.16	4.61
	(0.98)	(1.51)	(1.18)
Increased Activities	3.24	4.08	3.84
	(1.10)	(1.36)	(1.39)
Pain Behaviors	4.20	4.50	4.56
	(0.91)	(1.29)	(0.73)
Ability to Control Pain	4.57	3.09	3.00
	(1.19)	(0.97)	(1.03)
Ability to Decrease Pain	4.46	3.14	3.06
	(1.16)	(0.83)	(1.00)

Table 5. Coping Strategies Questionnaire Univariate Analysis of Variance No-Pain Subjects, Chronic Low Back Pain Patients—No Treatment, Chronic Low Back Pain Patients—Treatment (Pre)

Variable	MS Hypotheses	MS Errors	F-Ratio	Prob.
Diverting Attention	1.47	1.87	0.78	0.45
Reinterpreting Pain	5.65	1.27	4.46	0.01
Coping Self Statements	19.92	1.16	17.16	0.00
Ignoring Pain	0.52	2.11	0.31	0.73
Praying or Hoping	15.22	2.11	7.21	0.00
Catastrophizing	67.30	1.21	55.53	0.00
Increased Activities	8.04	1.39	5.77	0.00
Pain Behaviors	1.57	0.91	1.72	0.18
Ability to Control Pain	33.04	1.30	25.39	0.00
Ability to Decrease Pain	26.46	1.20	22.05	0.00

One-tailed, DF = 2,137

the CLBP-T (Pre) and CLBP-NT groups also demonstrated greater tendencies than the No-Pain group to resort to Hoping or Praying.

The results, however, did not support the hypothesis that CLBP patients are different from No-Pain subjects in employing Diverting Attention strategies and in their inclination toward Reinterpreting and Ignoring pain sensations.

Health Locus of Control

Table 6 presents the means and standard deviations of the three subject groups across the Multidimensional Health Locus of Control subscales, which are Internal Health Locus of Control, Powerful Others Health Locus of Control, and Chance Health Locus of Control.

A one-way Multivariate Analysis of Variance (MANOVA) suggests significant differences among the three groups in health locus of control beliefs (Wilk's Lambda F=15.54, p=.00). Table 7 summarizes the results of ANOVA, which pointed out significant differences on all three Health Locus of Control dimensions.

To determine which of the groups were different, the Scheffe multiple comparison test was conducted. The results support the assumption of equality between the CLBP-NT and the CLBP-T (Pre) groups on all three Health Locus of Control dimensions. The results also support the hypothesis of significant differences between CLBP patients and No-Pain subjects. Both CLBP-NT and CLBP-T (Pre) groups reported measurably less Internal Health Locus of Control beliefs and greater conviction in Chance Locus of Control.

The results, however, did not fully support the hypothesis pertaining to Powerful Others Health Locus of Control beliefs. Only the CLBP-NT group expressed stronger Powerful Others beliefs than the No-Pain group.

Table 6. Multidimensional Health Locus of Control Table of Means and Standard Deviations
No-Pain Subjects (No-Pain), Chronic Low Back Pain Patients—No Treatment (CLBP-NT), Chronic Low Back Pain Patients—Treatment (Pre) (CLBP-T (Pre))

Variable	No-Pain (100)	CLBP-NT (22)	CLBP-T (Pre) (18)
Internal Health Locus of Control	5.03 (0.93)	3.45 (0.91)	3.41 (1.07)
Powerful Others Health Locus of Control	2.77 (0.84)	3.75 (1.05)	3.24 (1.21)
Chance Health Locus of Control	3.17 (1.08)	4.63 (1.17)	4.05 (0.98)

Table 7. Multidimensional Health Locus of Control Univariate Analysis of Variance
No-Pain Subjects, Chronic Low Back Pain Patients—No Treatment, Chronic Low Back Patients—Treatment (Pre)

Variable	MS (Hyp)	MS (Error)	F-Ratio	Prob.
Internal Health Locus of Control	36.96	0.90	40.77	0.00
Powerful Others Health Locus of Control	9.41	0.87	10.86	0.00
Chance Health Locus of Control	22.31	1.18	18.95	0.00

One-tailed, DF = 2,137

Emotional Distress

Table 8 presents the means and standard deviations of the three groups across the Basic Personality Inventory subscales. What is immediately apparent is the large and substantive differences between the two CLBP groups and the No-Pain group. The significance of these differences was confirmed by MANOVA (Wilk's Lambda F=8.93, p=.00) and ANOVA (Table 9).

The Scheffe multiple comparison test asserted the expected similarities and differences among the subject groups. The results support the assumption of equality between the CLBP-NT and the CLBP-T (Pre) groups on all 12 Basic Personality Inventory subscales. The results further support the hypothesis that CLBP patients are significantly different from No-Pain subjects in their heightened level of Hypochondriasis, Depression, Anxiety, Social Introversion, Self Depreciation, and Deviation.

C. Relationships Among Variables

The degree of relationship among all the demographic data and the dependent variables was measured using the Pearson Product Moment Correlation Method. Because the CLBP-T (Pre) and the CLBP-NT groups proved to be similar on all the research variables, data pertaining to all the CLBP patients were collapsed together and all the variables were correlated with each other to produce a correlation coefficient. Only the significant correlations at $p \leq .01$ are reported.

In reviewing the interrelationships among the demographic variables, a moderate correlation was observed between length of pain and older age (r=.36) and length of pain and the likelihood of receiving disability payment (r=.34). Disability payments were also associated with clearer etiology of the pain (i.e. injury or disease) (r=.40). In relation to the research variables, older age was

Table 8. Basic Personality Inventory Table of Means and Standard Deviations
No-Pain Subjects (No-Pain), Chronic Low Back Pain Patients—No Treatment (CLBP-NT), Chronic Low Back Pain Patients—Treatment (Pre) (CLBP-T (Pre))

Variable	No-Pain (100)	CLBP-NT (22)	CLBP-T (Pre) (18)
Hypochondriasis	4.18	10.82	11.00
	(2.90)	(3.97)	(3.33)
Depression	2.87	9.09	9.83
	(2.90)	(3.64)	(4.37)
Denial	5.42	6.64	7.22
	(2.57)	(2.90)	(2.82)
Interpersonal Problems	7.92	7.59	6.39
	(3.68)	(2.81)	(2.85)
Alienation	3.39	2.73	2.78
	(2.39)	(1.75)	(1.44)
Persecutory Ideas	3.70	4.09	4.11
	(2.51)	(3.04)	(2.76)
Anxiety	6.47	11.05	10.67
	(3.80)	(3.42)	(2.57)
Thinking Disorder	1.71	1.73	2.56
	(1.56)	(1.83)	(2.73)
Impulse Expression	5.46	4.91	4.94
	(3.33)	(2.65)	(2.88)
Social Introversion	4.85	6.86	6.89
	(3.02)	(2.53)	(2.72)
Self Depreciation	1.47	4.05	4.06
	(1.65)	(2.03)	(2.41)
Deviation	1.51	2.73	2.83
	(1.42)	(2.05)	(2.96)

Table 9. Basic Personality Inventory Univariate Analysis of Variance No-Pain Subjects, Chronic Low Back Pain Patients—No Treatment, Chronic Low Back Pain Patients—Treatment (Pre)

Variable	MS (Hyp)	MS (Error)	F-Ratio	Prob.
Hypochondriasis	645.28	9.87	65.33	0.00
Depression	616.56	10.46	58.92	0.00
Denial	32.99	7.07	4.57	0.01
Interpersonal Problems	17.96	11.98	1.50	0.22
Alienation	5.86	4.87	1.20	0.30
Persecutory Ideas	2.29	6.92	.33	0.71
Anxiety	277.91	13.04	21.32	0.00
Thinking Disorder	5.57	3.19	1.74	0.17
Impulse Expression	4.10	10.10	.41	0.66
Social Introversion	58.58	8.48	6.91	0.00
Self Depreciation	95.09	3.32	28.64	0.00
Deviation	22.92	3.18	7.20	0.00

One-tailed, DF = 2,137

found to be related to Pain Evaluative (r=.41). Duration of pain was associated with Pain Affective (r=.37), Pain Evaluative (r=.39), and Pain Intensity (r=.34). Older CLBP patients seemed to rely more on Praying or Hoping (r=.37), and the more educated patients displayed fewer pain behaviors (r=-.35). A higher level of education among CLBP patients was also found to be negatively correlated with Chance Health Locus of Control beliefs (r=-.43). Female CLBP patients showed a greater tendency to manifest Depression (r=.35), while male patients were more inclined to indicate Alienation (r=.49). The more educated patients expressed less Thinking Disorder (r=-.40) and less Self Depreciation (r=-.34). The unemployed CLBP patients and those on sick leave were more likely to have elevated scores in Hypochondriasis (r=.48), Thinking Disorder (r=.42), and Deviation (r=.39).

Table 10 presents the Pearson correlation coefficients of each of the dependent variables with each other variable. Significant correlations ($p \leq .01$) are depicted in bold print.

Significant correlations were noted between the Sensory and Affect subscales (r=.60) and between Evaluative and Affect (r=.44). The Affective and Evaluative subscales were correlated with the Pain Intensity (r=.38 and r=.58 respectively), but surprisingly there was no relationship observed between the Sensory subscale and Pain Intensity. Significant relationships were also observed between the Coping Strategy Questionnaire's subscales. Most of them are in line with what would be logically expected. For example, Diverting Attention and Reinterpreting Pain is r=.50 and Coping Self Statements and Ignoring Pain is r=.72. It is less clear why Praying or Hoping is correlated with Increased Activities (r=.61), although it may be explained by the dual relationship between the Increased Activi-

Table 10. Pearson Correlation Coefficients of All Dependent Variables

Variables	1	2	3	4	5	6	7	8
1. Pain Sensory	–							
2. Pain Affective	**.60**	–						
3. Pain Evaluative	.63	**.44**	–					
4. Pain Miscellaneous	**.55**	**.62**	**.48**	–				
5. Number of Words	**.76**	**.73**	.09	.61	–			
6. Pain Intensity	-.10	**.38**	**.58**	.30	.00	–		
7. Attention Diversion	-.15	.00	-.01	.16	.08	.23	–	
8. Reinterpreting Pain	-.12	-.13	-.11	-.09	-.04	-.15	**.50**	–
9. Coping Self Statements	.05	-.11	-.14	.13	.14	-.29	**.36**	**.44**
10. Ignoring Pain	-.17	**-.36**	.00	.00	-.14	-.18	.33	**.53**
11. Praying or Hoping	.05	.20	.13	.15	.12	**.37**	**.58**	.31
12. Catastrophizing	.11	**.51**	.33	.32	**.36**	**.56**	.22	-.03
13. Increased Activities	-.03	.00	.07	.05	.18	.09	**.80**	**.43**
14. Pain Behaviors	.15	.30	.27	.17	.16	**.42**	**.46**	.13
15. Ability to Control	-.12	-.27	-.32	-.11	-.10	-.30	.16	.07
16. Ability to Decrease	-.17	-.14	-.15	-.12	-.14	-.04	.06	-.17
17. Internal Control	.30	.25	-.16	.21	**.37**	-.27	.04	.00
18. Powerful Others Control	.19	.31	.10	.20	.26	**.42**	.16	**-.37**
19. Chance Control	.09	.17	.00	.10	.09	**.47**	.18	-.15
20. Hypochondriasis	.16	**.35**	.30	**.46**	**.36**	**.34**	.07	-.27
21. Depression	.11	**.53**	.23	**.39**	.32	**.54**	.03	-.26
22. Denial	.00	.11	.02	-.15	-.11	.02	.00	-.09
23. Interpersonal Problems	.16	.33	.21	.27	.29	.03	-.19	-.25
24. Alienation	-.14	-.04	.06	-.08	.01	.08	-.05	.03
25. Persecutory Ideas	.00	**.36**	.10	**.39**	.27	.27	.07	-.20
26. Anxiety	-.08	.15	.09	.30	.17	.31	.04	-.21
27. Thinking Disorder	.19	**.59**	.29	**.36**	**.44**	**.44**	.08	-.02
28. Impulse Expression	.11	**.36**	.29	**.35**	.14	**.40**	-.05	-.11
29. Social Introversion	.07	.19	-.09	-.01	.15	.14	-.11	-.13
30. Self Depreciation	.19	**.39**	.18	**.34**	.23	.28	-.04	-.23
31. Deviation	.15	**.53**	.21	.33	**.41**	**.46**	.01	-.27

Table 10. Pearson Correlation Coefficients of All Dependent Variables (Cont'd)

Variables	9	10	11	12	13	14	15	16
1. Pain Sensory								
2. Pain Affective								
3. Pain Evaluative								
4. Pain Miscellaneous								
5. Number of Words								
6. Pain Intensity								
7. Attention Diversion								
8. Reinterpreting Pain								
9. Coping Self Statements	-							
10. Ignoring Pain	**.72**	-						
11. Praying or Hoping	.23	.21	-					
12. Catastrophizing	-.29	-.25	.34	-				
13. Increased Activities	**.43**	.29	**.61**	.19	-			
14. Pain Behaviors	.08	.06	**.53**	.33	**.50**	-		
15. Ability to Control	.21	.22	.06	-.21	.10	.06	-	
16. Ability to Decrease	.06	.14	.08	-.28	-.03	.12	**.51**	-
17. Internal Control	.32	.04	-.14	.00	.14	.07	.07	.04
18. Powerful Others Control	-.12	-.22	.27	.21	.23	**.42**	-.07	.06
19. Chance Control	-.18	-.19	**.37**	**.35**	.12	.24	-.28	-.08
20. Hypochondriasis	-.23	-.20	.28	**.45**	.14	.14	**-.38**	-.24
21. Depression	**-.51**	**-.44**	.17	**.72**	.01	.18	-.21	-.17
22. Denial	-.05	-.08	.23	-.17	.11	.28	-.01	.22
23. Interpersonal Problems	-.03	-.21	-.28	.34	-.12	-.25	-.11	**-.45**
24. Alienation	-.06	-.10	-.11	.15	-.15	-.07	-.04	-.19
25. Persecutory Ideas	-.10	-.14	.22	**.38**	.03	.21	-.17	-.14
26. Anxiety	**-.40**	-.24	.05	**.52**	.03	-.08	-.28	-.30
27. Thinking Disorder	-.24	-.31	.13	**.55**	.03	.21	**-.36**	-.29
28. Impulse Expression	-.34	-.27	-.13	**.53**	-.17	.12	-.28	**-.37**
29. Social Introversion	-.28	-.16	-.02	.25	-.16	-.08	-.16	-.19
30. Self Depreciation	**-.39**	-.23	.06	.33	-.08	.12	-.19	-.10
31. Deviation	-.34	**-.36**	-.02	**.62**	-.03	.16	**-.41**	-.20

Table 10. Pearson Correlation Coefficients of All Dependent Variables (Cont'd)

Variables	17	18	19	20	21	22	23	24
1. Pain Sensory								
2. Pain Affective								
3. Pain Evaluative								
4. Pain Miscellaneous								
5. Number of Words								
6. Pain Intensity								
7. Attention Diversion								
8. Reinterpreting Pain								
9. Coping Self Statements								
10. Ignoring Pain								
11. Praying or Hoping								
12. Catastrophizing								
13. Increased Activities								
14. Pain Behaviors								
15. Ability to Control								
16. Ability to Decrease								
17. Internal Control	-							
18. Powerful Others Control	.09	-						
19. Chance Control	-.32	**.44**	-					
20. Hypochondriasis	-.14	.22	.34	-				
21. Depression	-.03	.17	.29	**.60**	-			
22. Denial	.01	.23	.03	.02	-.05	-		
23. Interpersonal Problems	.17	-.02	-.10	.18	.29	-.26	-	
24. Alienation	-.20	-.06	.00	.15	.02	.04	.26	-
25. Persecutory Ideas	.01	.12	.26	**.73**	**.60**	.02	.23	.11
26. Anxiety	.00	.10	.17	**.59**	**.72**	-.15	.27	.06
27. Thinking Disorder	.01	.21	**.35**	**.61**	**.62**	-.11	.25	.25
28. Impulse Expression	.08	.22	.19	.25	**.53**	-.33	.31	.06
29. Social Introversion	-.06	.17	.26	.28	.34	.29	.21	**.51**
30. Self Depreciation	-.19	.16	.17	**.53**	**.63**	.13	.10	-.04
31. Deviation	.02	**.38**	**.42**	**.59**	**.71**	-.10	.29	.12

Table 10. Pearson Correlation Coefficients of All Dependent Variables (Cont'd)

Variables	25	26	27	28	29	30	31
1. Pain Sensory							
2. Pain Affective							
3. Pain Evaluative							
4. Pain Miscellaneous							
5. Number of Words							
6. Pain Intensity							
7. Attention Diversion							
8. Reinterpreting Pain							
9. Coping Self Statements							
10. Ignoring Pain							
11. Praying or Hoping							
12. Catastrophizing							
13. Increased Activities							
14. Pain Behaviors							
15. Ability to Control							
16. Ability to Decrease							
17. Internal Control							
18. Powerful Others Control							
19. Chance Control							
20. Hypochondriasis							
21. Depression							
22. Denial							
23. Interpersonal Problems							
24. Alienation							
25. Persecutory Ideas	-						
26. Anxiety	**.55**	-					
27. Thinking Disorder	**.69**	**.44**	-				
28. Impulse Expression	**.41**	**.48**	**.50**	-			
29. Social Introversion	.23	.24	.31	.10	-		
30. Self Depreciation	**.50**	**.50**	**.44**	**.36**	**.45**	-	
31. Deviation	**.60**	**.55**	**.73**	**.67**	.25	**.48**	-

ties and Pain Behaviors (r=.50) and Pain Behaviors and Praying or Hoping (r=.58). As expected, there was a relationship between Chance and Powerful Others beliefs (r=.44).

As for the various intercorrelations among the Basic Personality Inventory subscales, Depression was highly correlated with Anxiety (r=.72), Deviation (r=.71), Self Depreciation (r=.63), Thinking Disorder (r=.62), Persecuting Ideas (r=.60), Hypochondriasis (r=.60), Impulse Expression (r=.53), and Social Introversion (r=.34). Anxiety was associated with Hypochondriasis (r=.59), Persecuting Ideas (r=.55), Deviation (r=.55), Self Depreciation (r=.50), Impulse Expression (r=.48), and Thinking Disorder (r=.44). Social Introversion was correlated also with Alienation (r=.57); Self Depreciation was related to Hypochrondriasis (r=.53), Persecuting Ideas (r=.50), Thinking Disorder (r=.44), and Social Introversion (r=.45).

Correlation coefficients were also computed between the different research instruments' subscales. Catastrophizing was positively correlated with Pain Affect (r=.51) and Pain Intensity (r=.56). It was also highly correlated with Hypochondriasis (r=.45), Depression (r=.72), Anxiety (r=.52), Thinking Disorder (r=.55), Impulse Expression (r=.53), and Deviation (r=.62). Coping Self Statements seems to be the most adaptive coping strategy in terms of emotional distress. It was negatively correlated with Depression (r=-.51), Anxiety (r=-.40), and Self Depreciation (r=-.39). Ignoring Sensation too was negatively correlated with Depression (r=-.44), and Pain Behaviors were correlated with Pain Intensity (r=.42). Belief in one's ability to control pain was inversely related to Hypochondriasis (r=-.38), and belief in one's ability to decrease pain was negatively correlated with Interpersonal Problems (r=-.45).

Powerful Others Health Locus of Control beliefs were correlated with Pain Intensity (r=.42), Deviation (r=.38), Pain Behaviors (r=.42), and Reinterpreting Pain Sensation (r=-.37). Chance Health Locus of Control beliefs were correlated with Pain Intensity (r=.47), Thinking Disorder (r=.35), Deviation (r=.42), Catastrophizing (r=.35), and Praying or Hoping (r=.37).

D. Treatment Efficacy

To evaluate the treatment effects on all the dependent variables, the mean differences of the CLBP-T (Pre) and CLBP-T (Post) measures were analyzed. In order to ascertain further the significance of the treatment outcomes and to counter the sensitivity of repeated measures design, means changes between CLBP-T (Post) and CLBP-NT were also investigated.

Pain

Table 11 presents the means, standard deviations, and the differences between the CLBP-T (Pre) and CLBP-T (Post) means. A noted reduction, ranging from .2 to 1.0 Standard Deviation, was observed on all the McGill Pain Questionnaire's subscales. In order to determine the significance of the treatment effects, a one-tailed ANOVA was carried out (Table 12). The results show significant reduction at the Sensory, Affective, and Evaluative dimensions of pain and highly significant reduction in the Perceived Pain Intensity. Further examination of the individual's CLBP-T (Post) scores reveals that 14 (78%), 11 (65%), and 12 (70%) indicated a measurable reduction in their pain Sensory, Affective, and Evaluative subscales respectively. Thirteen (72%) CLBP-T (Post) patients indicated a substantial decrease in their Pain Intensity level, and no one reported any increase.

Similar comparisons were made between CLBP-T (Post) and CLBP-NT (Table 13). As noted above, this was considered to be a less sensitive test than

Table 11. McGill Pain Questionnaire Table of Means and Standard Deviations Chronic Low Back Pain Patients—Treatment (Pre) (CLBP-T (Pre)), Chronic Low Back Pain Patients—Treatment (Post) (CLBP-T (Post))

Variable	CLBP-T (Pre)	CLBP-T (Post)	Differences
Pain--Sensory	18.83	15.83	-3.00
	(6.84)	(6.99)	(4.54)
Pain-Affective	4.33	3.33	-1.00
	(2.87)	(3.28)	(2.23)
Pain--Evaluative	2.89	2.17	-0.72
	(1.40)	(1.34)	(1.30)
Pain--Miscellaneous	5.67	5.17	-0.50
	(2.59)	(2.06)	(1.46)
Number of Words	13.50	12.33	-1.17
	(4.00)	(4.20)	(2.59)
Pain Intensity	2.83	2.05	-0.78
	(0.79)	(0.72)	(0.55)

Table 12. McGill Pain Questionnaire Analysis of Variance with Repeated Measures
Chronic Low Back Pain Patients—Treatment (Pre), Chronic Low Back Pain Patients—Treatment (Post)

Variable	MS (Hyp)	MS (Error)	F-Ratio	Prob.
Pain--Sensory	0.81	0.10	7.87	0.01
Pain--Affective	0.40	0.10	4.21	0.05
Pain--Evaluative	4.69	0.81	5.78	0.02
Pain-Miscellaneous	0.14	0.07	2.10	0.16
Number of Words	2.25	3.37	3.64	0.07
Pain Intensity	5.44	0.15	36.22	0.00

One-tailed, DF = 1,17

Table 13. McGill Pain Questionnaire Analysis of Variance Chronic Low Back Pain Patients—Treatment (Post), Chronic Low Back Pain Patients--No Treatment

Variable	MS (Hyp)	MS (Error)	F-Ratio	Prob.
Pain--Sensory	39.90	48.47	0.80	0.37
Pain--Affective	0.03	9.09	0.00	0.95
Pain--Evaluative	4.20	1.68	2.50	0.12
Pain--Miscellaneous	6.88	7.38	0.93	0.34
Number of Words	3.82	18.71	0.20	0.65
Pain Intensity	7.21	0.81	8.91	0.00

One-tailed, DF = 1,138

the repeated measures design, and it was executed to verify if the changes were substantive enough to withstand more stringent analysis. The results confirmed the significance of the decrement in pain intensity and thereby support the related research hypothesis. The other hypotheses concerning the expected decrease in the three pain dimensions (Sensory, Affect, and Evaluative) and in the number of words used to describe pain were not supported.

Coping Strategies

Table 14 presents the means, standard deviations, and the differences between the CLBP-T (Pre) and CLBP-T (Post) means. The CLBP-T (Post) group recorded increases in utilizing Diverting Attention (1.0 Standard Deviation), Reinterpreting Pain (1.8 S.D.), Ignoring Pain (0.5 S.D.), and Coping Self Statements (1.3 S.D.) as well as an enhanced belief in the ability to control and decrease pain (1.5 S.D.). In addition, the CLBP-T (Post) group Catastrophized much less than before (1.5 S.D.). These treatment effects were found to be statistically significant by one-tailed ANOVA (Table 15).

Similar comparisons were made between the CLBP-T (Post) and CLBP-NT (Table 16). All the significant differences which were observed between the CLBP-T (Pre) and CLBP-T (Post) were also evident between the CLBP-T (Post) and CLBP-NT groups. These results support the research hypothesis regarding treatment effect on greater use of Diverting Attention, Reinterpreting and Ignoring Pain, Coping Self Statements, increased confidence in one's ability to control and decrease pain, and less Catastrophizing.

Health Locus of Control

Table 17 presents the means, standard deviations, and the differences between the CLBP-T (Pre) and CLBP-T (Post) means. The noted changes were

Table 14. Coping Strategies Questionnaire Table of Means and Standard Deviations
Chronic Low Back Pain Patients—Treatment (Pre) (CLBP-T (Pre)), Chronic Low Back Pain Patients—Treatment (Post) (CLBP-T (Post))

Variable	CLBP-T (Pre) (18)	CLBP-T (Post) (18)	Difference
Diverting Attention	2.95	4.47	+1.52
	(1.45)	(1.28)	(1.04)
Reinterpreting Pain	1.79	3.31	+1.52
	(0.83)	(1.18)	(1.08)
Coping Self Statements	3.36	4.99	+1.63
	(1.24)	(1.15)	(0.77)
Ignoring Pain	3.56	4.30	+0.74
	(1.33)	(1.25)	(0.95)
Praying or Hoping	3.99	4.25	+0.26
	(1.69)	(1.47)	(0.73)
Catastrophizing	4.61	2.79	-1.82
	(1.18)	(1.13)	(1.00)
Increased Activities	3.84	4.64	+0.80
	(1.30)	(1.00)	(0.97)
Pain Behaviors	4.56	4.71	+0.16
	(0.73)	(0.82)	(0.76)
Ability to Control Pain	3.00	4.61	+1.61
	(1.03)	(0.92)	(1.04)
Ability to Decrease Pain	3.06	4.56	+1.50
	(1.00)	(0.71)	(0.98)

Table 15. Coping Strategies Questionnaire Analysis of Variance with Repeated Measures
Chronic Low Back Pain Patients—Treatment (Pre), Chronic Low Back Pain Patients—Treatment (Post)

Variable	MS (Hyp)	MS (error)	F-Ratio	Prob.
Diverting Attention	20.75	0.54	38.15	0.00
Reinterpreting Pain	20.75	0.58	35.79	0.00
Coping Self Statements	23.90	0.30	80.13	0.00
Ignoring Pain	4.94	0.45	10.94	0.00
Praying or Hoping	0.60	0.27	2.27	0.15
Catastrophizing	29.95	0.50	59.60	0.00
Increased Activities	5.71	0.47	12.10	0.00
Pain Behaviors	0.22	0.29	0.77	0.39
Ability to Control Pain	3.60	0.54	6.71	0.00
Ability to Decrease Pain	3.74	0.49	7.70	0.00

One-tailed, DF = 1,17

Table 16. Coping Strategies Questionnaire Analysis of Variance
Chronic Low Back Pain Patients--Treatment (Post), Chronic Low Back Pain Patients--No Treatment

Variable	MS (Hyp)	MS (Error)	F-Ratio	Prob.
Diverting Attention	9.50	1.94	4.90	0.03
Reinterpreting Pain	27.33	0.87	31.50	0.00
Coping Self Statements	19.82	0.94	21.01	0.00
Ignoring Pain	6.76	1.42	4.75	0.03
Praying or Hoping	1.00	2.61	0.38	0.53
Catastrophizing	18.64	1.83	10.18	0.00
Increased Activities	3.06	1.46	2.09	0.15
Pain Behaviors	0.45	1.21	0.37	0.54
Ability to Control Pain	22.88	0.90	25.50	0.00
Ability to Decrease Pain	19.94	0.61	32.89	0.00

One-tailed, DF = 1,38

Table 17. Multidimensional Health Locus of Control Table of Means and Standard Deviations
Chronic Low Back Pain Patients—Treatment (Pre) (CLBP-T (Pre)), Chronic Low Back Pain Patients—Treatment (Post) (CLBP-T (Post))

Variable	CLBP-T (Pre)	CLBP-T (Post)	Difference
Internal	3.41	4.90	+1.49
Health Locus of Control	(1.07)	(1.01)	(0.96)
Powerful Others	3.24	3.18	-0.06
Health Locus of Control	(1.21)	(1.24)	(0.68)
Chance	4.05	3.04	-1.01
Health Locus of Control	(0.98)	(1.08)	(0.77)

an increase in Internal Health Locus of Control beliefs (1.4 Standard Deviation) and a decrease in Chance Health Locus of Control beliefs (1.0 S.D.). These changes were found to be significant (Table 18). On an individual basis, 17 (95%) of the CLBP-T (Post) patients indicated marked increase in their Internal Health Locus of Control beliefs and 15 (88%) reported a decrease in their Chance Locus of Control beliefs.

Further ANOVA between CLBP-T (Post) and CLBP-NT (Table 19) demonstrated the same significant changes. These results support the research hypotheses regarding treatment effects on increasing Internal Health Locus of Control beliefs and lessening the Chance Health Locus of Control beliefs. The research hypothesis concerning decrease in Powerful Others Health Locus of Control beliefs was not supported.

Emotional Distress

Table 20 presents the standard deviations, means, and differences between the CLBP-T (Pre) and CLBP-T (Post) means. Substantive changes were noted, with the largest decrements observed in Anxiety (1.38 Standard Deviation), Depression (.85 S.D.), Hypochrondriasis (.50 S.D.), Social Introversion (.75 S.D.), Self Depreciation (.60 S.D.), and Deviation (.30 S.D.). Consequent ANOVA (Table 21) substantiated the significance of the recorded changes between CLBP-T (Pre) and CLBP-T (Post). Further examination of the individual's CLBP-T (Post) scores demonstrated that all 18 patients reported a significant reduction in their Anxiety and 17 (95%) in their Depression. Fourteen (78%) were rated as having less Hypochondriasis, 13 (72%) less Social Introversion, and 15 (83%) indicated less tendency toward Self Depreciation. Nine (50%) reported a decrease in Deviation.

Table 18. Multidimensional Health Locus of Control Analysis of Variance with Repeated Measures
Chronic Low Back Pain Patients—Treatment (Pre), Chronic Low Back Pain Patients—Treatment (Post)

Variable	MS (Hyp)	MS (Error)	F-Ratio	Prob.
Internal Health Locus of Control	20.00	0.47	42.58	0.00
Powerful Others Health Locus of Control	0.04	0.23	0.17	0.68
Chance Health Locus of Control	9.17	0.30	30.75	0.00

One-tailed, DF = 1,17

Table 19. Multidimensional Health Locus of Control Analysis of Variance
Chronic Low Back Pain Patients--Treatment (Post), Chronic Low Back Patients--No Treatment

Variable	MS (Hyp)	MS (Error)	F-Ratio	Prob.
Internal Health Locus of Control	20.85	0.92	22.65	0.00
Powerful Others Health Locus of Control	3.26	1.29	2.52	0.12
Chance Health Locus of Control	25.08	1.28	19.55	0.00

One-tailed, DF = 1,38

Table 20. Basic Personality Inventory Table of Means and Standard Deviations
Chronic Low Back Pain Patients—Treatment (Pre) (CLBP-T (Pre)), Chronic Low Back Pain Patients—Treatment (Post) (CLBP-T (Post))

Variable	CLBP-T (Pre) (18)	CLBP-T (Post) (18)	Differences
Hypochondriasis	11.00	9.28	-1.72
	(3.33)	(3.56)	(1.64)
Depression	9.83	6.11	-3.72
	(4.37)	(4.21)	(1.64)
Denial	7.22	7.33	+0.11
	(2.82)	(2.70)	(1.57)
Interpersonal Problems	6.39	6.28	-0.11
	(2.85)	(2.89)	(1.18)
Alienation	2.78	2.72	-0.06
	(1.44)	(1.45)	(1.47)
Persecutory Ideas	4.11	3.67	-0.44
	(1.76)	(2.85)	(1.82)
Anxiety	10.67	7.11	-3.56
	(2.57)	(2.76)	(1.50)
Thinking Disorder	2.56	2.33	-0.23
	(2.73)	(2.47)	(1.06)
Impulse Expression	4.94	4.17	-0.77
	(2.88)	(2.09)	(1.73)
Social Introversion	6.89	4.78	-2.11
	(2.72)	(2.78)	(1.97)
Self Depreciation	4.06	2.39	-1.67
	(2.41)	(2.50)	(1.33)
Deviation	2.83	2.00	-0.83
	(2.96)	(2.93)	(1.20)

Table 21. Basic Personality Inventory Analysis of Variance with Repeated Measures
Chronic Low Back Pain Patients—Treatment (Pre), Chronic Low Back Pain Patients—Treatment (Post)

Variable	MS (Hyp)	MS (Error)	F-Ratio	Prob.
Hypochondriasis	26.69	1.34	19.90	0.00
Depression	124.69	1.34	92.95	0.00
Denial	0.11	1.23	0.09	0.76
Interpersonal Problems	0.11	0.70	0.16	0.69
Alienation	0.03	1.09	0.03	0.87
Persecutory Ideas	1.78	1.65	1.87	0.31
Anxiety	113.78	1.13	100.62	0.00
Thinking Disorder	0.44	1.50	0.79	0.38
Impulse Expression	5.44	1.50	3.62	0.07
Social Introversion	40.11	1.93	20.73	0.00
Self Depreciation	25.00	0.88	28.33	0.00
Deviation	6.25	0.72	8.67	0.00

One-tailed, DF = 1,17

Similar comparisons were carried out between the CLBP-T (Post) and the CLBP-NT groups to see if the changes were substantive enough to be observed even in a less sensitive test than the within-subject repeated measures design. The results (Table 22) reiterate the significance of most of the changes. They serve to demonstrate that the treatment effects in lowering Depression, Anxiety, Social Introversion, and Self Depreciation in CLBP patients were large enough to be apparent in even a between-subject design. These results support the research hypothesis which stipulated such treatment effects.

E. Participants' Treatment Evaluation

At the very end of the last treatment session, CLBP-T subjects were asked to complete an evaluation form which was comprised of 10 seven-point Likert scale items (1 = strongly disagree, 7 = strongly agree), comments, and suggestions (Appendix H). All 18 Treatment patients completed the evaluation form anonymously. Table 23 summarizes the means and standard deviations of the responses, and quotes comments and suggestions for improvement offered by the respondents. The results suggest a high level of satisfaction with the relevancy and usefulness of the treatment and with the therapist's performance.

Table 22. Basic Personality Inventory Analysis of Variance Chronic Low Back Pain Patients—Treatment (Post), Chronic Low Back Pain Patients—No Treatment

Variable	MS (Hyp)	MS (Error)	F-Ratio	Prob.
Hypochondriasis	23.49	14.39	1.63	0.20
Depression	87.90	15.25	5.76	0.01
Denial	4.81	7.92	0.61	0.44
Interpersonal Problems	17.07	8.08	2.11	0.15
Alienation	0.00	2.63	0.00	0.99
Persecutory Ideas	1.78	8.73	0.20	0.65
Anxiety	153.24	9.86	15.54	0.00
Thinking Disorder	3.64	4.59	0.79	0.37
Impulse Expression	5.46	8.17	0.67	0.41
Social Introversion	43.07	6.99	6.16	0.01
Self Depreciation	27.17	5.09	5.34	0.02
Deviation	5.24	6.17	0.85	0.36

One-tailed, DF = 1,38

Table 23. Participants' Treatment Evaluation (N=18)

Statement	Mean Response (S.D.)
1. The treatment program was helpful.	6.05 (1.47)
2. The treatment program was useful.	6.44 (0.70)
3. The treatment material was relevant.	6.17 (0.86)
4. The treatment program helps me to cope better with my pain.	6.22 (0.81)
5. The therapist showed understanding of group members and their problems.	6.67 (0.48)
6. The therapist listened carefully to what was said and accepted members as they are.	6.78 (0.43)
7. The therapist helped members feel they are worthwhile persons with potential.	6.72 (0.46)
8. The therapist encouraged members to become more self-reliant.	6.83 (0.38)
9. Overall I would rate the therapist	6.70 (0.46)
10. If a good friend who suffers from chronic back pain asked me about this treatment program, I would recommend it	6.67 (0.48)

11. Comments about the Program

- I very much approve of the program and I greatly agree that I will benefit from this.
- I believe it is extremely helpful for anyone who is willing to fully use all the ideas which are given.
- The relaxation tape most helpful for me, the best I have heard.
- Very encouraging—has helped me to accept and carry on from there—believing there is hope for improvement.
- I was helped greatly.
- Homework assignments were really a help, one, to keep me focused on the new ideas and two, to help me set aside time each day.
- It has been an eye opener. Wished I would get some more help in the future.
- I have enjoyed this program and am glad that I participated. It has helped me at least 30%.
- Every aspect was helpful in dealing with what has appeared to be a no-win situation.
- Very good to know alternatives are available. Self control is paramount.

(Cont'd)

Table 23. (Cont'd)

- Helps people to know they are not alone, and life does go on and can be quite pleasant after learning some of the coping ideas and suggestions.
- I got some wonderful help, and I'm going to use it.
- Very helpful.
- This program gives many coping methods which can be utilized to help cope with chronic pain. It requires a lot of work and patience.
- Excellent program. One of the best I've ever attended.

12. Suggestions for Improvement

- The sessions should be longer to allow for more discussion among patients.
- Would be good to have more time to let individuals talk and more casual discussion.
- Offer on evenings or Saturdays to be more accessible.
- Would like to have an opportunity for follow-up sessions.
- More of same.

V. DISCUSSION

In this chapter, the results of the study will be discussed as they relate to the research questions. In addition, methodological considerations and possible limitations will be addressed. Suggestions for further research and implications for therapy will close the chapter.

A. Discussion of Results

The initial question was to determine how CLBP patients and No-Pain subjects might differ on the dependent measures. The results clearly show that CLBP patients were significantly different from the No-Pain subjects on most of the research variables. Both patient groups, CLBP-T and CLBP-NT, were found similar to each other and significantly different from the No-Pain group. These results, which will be discussed in more detail in the following sections, support the hypotheses of unique characteristics which typify CLBP patients.

The second objective of this study was to evaluate the treatment effect of cognitive-behavioral therapy on a multitude of dependent variables pertaining to pain, coping strategies, locus of control beliefs, and emotional distress. The efficacy of the treatment was clearly demonstrated. All changes were in the predicted directions and the magnitude of the changes which can be attributed to the treatment effect were one-half standard deviation or greater. It was also demonstrated that the great majority of the chronic low back pain patients who received the treatment indicated a marked improvement on many of the research measurements. For the sake of clarity, the results will be discussed in the order that the dependent variables were presented.

Pain

As expected by the definition of the study group, CLBP patients reported greater pain intensity than No-Pain subjects. However, with respect to the other dimensions of pain, no other differences were observed which would make distinct CLBP patients from No-Pain subjects. This was somehow surprising in view of Melzack's (1975) assertion that in addition to the intensity property, pain experience also varies in sensation, the degree of associated emotional malaise, and the meaning of pain for the sufferer. Though these factors are not necessarily independent, each has been shown to be an isolatable and measurable parameter of the pain experience (Gracely, McGrath, & Dubner, 1978).

Since the comparison in this study was made between subjects who experience current and prolonged pain and pain-free people who were asked to reflect on a pain episode that they had experienced some time in the past, the researcher expected the pain patients to check more—and more extreme—adjectives to describe the different dimensions of their pain. One plausible explanation for this not occurring may be that the experience of any severe pain is so entrenched in one's psyche that it results in a vivid and lasting memory. Of course another explanation may be that the McGill Pain Questionnaire lacks the sensitivity to distinguish between the different pain dimensions as was evident by the intercorrelations of the different dimensions (Table 10). Such explanation would be supported by Turk, Rudy, and Salovey (1985) who argue that the factors measured by the McGill Pain Questionnaire are highly intercorrelated and therefore are not distinct. They conclude that the McGill Pain Questionnaire does not seem to measure the three separate components of pain for which it was originally

designed. They advocate the use of the total score as a measure of general pain severity rather than separate sensory, affective, and evaluative subscale scores.

At first glance, in view of the above results, one might be inclined to adopt the more parsimonious approach to pain assessment and use only the pain intensity measure. Yet further investigation points out the merit of affective and evaluative subscales with CLBP patients. There is some evidence that the affective dimension of the verbal pain descriptive is significantly related to indexed measures of psychological disturbance. Veilleux and Melzack (1976) observe that psychotic patients characterize their pain with higher affective dimensional scores than medically ill patients; their mean affective score is also higher than their mean sensory score. Veilleux and Melzack actually suggest "high affective scores indicate the necessity of psychotherapeutic approaches in treating pain" (p. 535). The results of this study show a significant positive correlation between Pain—Affect and a few measures of psychopathologies: Depression (r=.53), Interpersonal Problems (r=.33), Persecuting Ideas (r=.36), Thinking Disorder (r=.59), Impulse Expression (r=.36), Self Depreciation (r=.39), and Deviation (r=.53). No significant relationships were observed in the No-Pain subjects between Pain—Affect and any of the Basic Personality Inventory scales. These findings are generally consistent with those of McCreary, Turner, and Dawson (1981) who found that patients attending an outpatient back pain clinic produced affective responses on the McGill Pain Questionnaire that were significantly correlated in a linear fashion with their score on each of the neurotic scales of the MMPI. Similarly, Kremer and Atkinson (1981) report significant linear relationships between Pain—Affect scores and scores on measures of emotional disturbance and functional disability.

The cognitive-behavioral treatment proved to be significantly effective in reducing patients' perceived intensity of pain. Though consistent decrease in all other pain measures was observed, it was not at a significant level.

Coping Strategies

The question of how CLBP patients cope with their pain, and especially what constitutes an effective and optimal coping strategy, was of special interest in this study. In order to ascertain the role of coping strategies, a number of basic questions were addressed. First, the frequency with which various coping strategies were used by CLBP patients was determined and contrasted with that of No-Pain subjects. Second, the relationship between the use of different types of coping strategies was examined.

Significant differences were observed in the frequencies with which CLBP patients used assorted coping strategies in comparison to the No-Pain group. CLBP patients reported strong reliance on Catastrophizing (mean = 4.61) followed by frequent use of Praying or Hoping (mean = 2.93). The No-Pain group, on the other hand, reported Coping Self Statements as the most demonstrative strategy used to combat pain (mean = 4.65). CLBP patients also indicated measurably less confidence than the No-Pain group in their ability to control and decrease pain.

The pattern of results suggest that the use of some strategies is related to poorer adjustment as measured by pain, emotional distress, and psychopathologies. The single most powerful maladaptive strategy proved to be Catastrophizing. Items of the Catastrophizing subscale reflect an irrational evaluation of pain that is likely to be associated with emotional disturbance. Indeed in the CLBP patients, Catastrophizing was highly correlated with Pain Intensity (r=.56), Depres-

sion (r=.72), Anxiety (r=.52), Thinking Disorder (r=.55), Impulse Expression (r=.53), and Deviation (r=.62). The finding that Catastrophizing is so strongly related to emotional affliction is not surprising. Meichenbaum and Turk (1976) suggest that catastrophizing may lead to feelings of helplessness and hopelessness and a general sense of loss of control. In this manner, they speculate an acute pain problem may evolve into chronic pain. Rush and Weissenburger (1982) demonstrate the association between catastrophizing and depression in a non-pain population. Rosensiel and Keefe (1983) and Turner and Clancy (1986) found significant positive correlation between catastrophizing, pain, and physical and psychological impairment. Spanos, Horton, and Chaves (1975) and Chaves and Brown (1978) found that individuals are able to control pain, not because they use any particular pain coping strategies but because they successfully avoid catastrophizing. In a later study, Chaves and Brown (1987) found that catastrophizing was associated with External locus of control. It is plausible that chronic pain patients who experience fewer catastrophizing thoughts may be more able to recognize the value of their own efforts in dealing with their pain and may cope more effectively by implementing adaptive strategies.

The Praying or Hoping scale was correlated with Chance locus of control (r=.37). The elevated score on this scale (mean = 3.99) indicates that the CLBP patients were frequently engaged in hoping or praying that the pain would somehow go away. Keefe and Dolan (1986) and Rosensiel and Keefe (1983) found praying and hoping to be a maladaptive coping strategy. Patients scoring high on this factor were more impaired in performing daily activities and had higher ratings of pain. It is conceivable that patients high on this variable may have greater difficulty in accepting the chronicity of their pain and greater reluctance in

assuming more responsibility for countering it. It should be noted, however, that Turner and Clancy (1986) found that increased use of praying and hoping was significantly related to reduction of pain intensity.

The present results do not support findings from previous studies which associated Coping Self Statements, Reinterpreting Pain Sensation, and Diverting Attention to lower ratings of pain (Rybstein-Blinchik & Grzesiak, 1979; Spanow, Horton, & Chaves, 1975). Particularly puzzling are the findings regarding Diverting Attention, which is considered to be one of the most salient and potent cognitive strategies. No relationships were found between Diverting Attention and any measure of pain or emotional disturbance. Rosensiel and Keefe (1983) point out that Attention Diversion techniques, though found to be useful in decreasing experimental pain, may not be a viable option for chronic pain sufferers. In support of this hypothesis, Rybstein-Blinchik and Grzesiak (1979) report that with chronic pain patients, training in reinterpretation techniques is more effective in attenuating pain and pain behaviors than a cognitive distraction method. A review by McCaul and Malott (1984) concludes that distraction techniques may be more helpful in alleviating mild rather than severe pain. Though the merit of incorporating the attention diversion procedure in cognitive-behavioral therapy may appear questionable, some qualifications are in order. Attention Diversion strategies within the context discussed in this study refer mostly to techniques such as counting numbers or getting involved with some mental exercise rather than engaging in actual activities. In order to diminish thinking and worrying about the pain and impairments, the latter may be more effective coping strategies for CLBP patients.

The pattern of results suggest that the use of some strategies is strongly related to positive adjustment. The most notable one was the Coping Self Statement. It was negatively correlated with Depression (r=-.51), Anxiety (r=-.40), Impulse Expression (r=-.34), and Deviation (r=-.34). Coping Self Statements was also correlated with Internal Health Locus of Control (r=.32). Although no correlation was found between Coping Self Statements and the Ability to Control Pain beliefs, the two may be mediated by Depression (r=-.38). Ignoring Pain proved to be another adaptive coping strategy which was also inversely correlated with Depression (r=-.44) and Deviation (r=-.36).

The results of this study suggest that CLBP patients employ diverse self-generating coping strategies in dealing with their pain. The pattern of the results raises some question about applying the term "coping" to the strategies assessed in the study. "Coping" implies that a strategy is related to a positive adjustment. Although patients report using these strategies in response to pain, in fact frequent use of certain coping strategies exacerbate pain and are related to poor adjustment. Nevertheless, the treatment effects were congruent with increasing the use of adaptive strategies and decreasing the reliance on maladaptive ones. Cognitive-behavioral therapy appears to help CLBP patients to recognize and modify irrational catastrophizing cognition, as was evidenced by the significant reduction in that response. In addition, there was greater utilization of the other adaptive cognitive strategies, namely Diverting Attention, Reinterpretation and Ignoring Pain, and the use of Coping Self Statements. There were also major increases in the patients' beliefs in their ability to control and decrease pain. One anomaly was observed with the Increase of Activity scale. Treatment effects on increased activity and decreased pain behaviors were not substantiated. It

is worth noting, however, that the CLBP patients did not differ from No-Pain subjects on these measures.

Health Locus of Control

The Health Locus of Control construct measures the extent that people believe that their health is determined by their behavior. The present results confirm the hypothesis that the No-Pain subjects will indicate a strong tendency toward Internal Health Locus of Control while CLBP patients will subscribe to Chance Health Locus of Control beliefs. These results are in accordance with Skevington's (1979) findings that chronic pain patients were more inclined to attribute outcome to chance than were pain-free controls. Interestingly in this study, only the CLBP-NT group showed a preference toward Powerful Others which was significantly higher than the No-Pain group's. However, it should be noted that for unexplained reasons, the CLBP-NT group also had higher mean scores on the Chance locus of control scale.

As a health-specific indicator of generalized expectancy, there is no reason to anticipate that Multidimensional Health Locus of Control scale scores alone should explain much of a variance in health behavior. Only in interaction with a multitude of contributing factors can health locus of control beliefs play a meaningful role in the explanation of health behaviors. In this study, health locus of control has been identified as a critical cognitive contributor to perceived pain intensity. As anticipated by the research hypothesis, a positive and significant correlation was observed between both Powerful Others and Chance subgroups and pain intensity ($r=.42$; $r=.47$ respectively). However, no other relationship was evident with any of the other pain measures. The noted relationship between Chance health locus and Catastrophizing ($r=.35$) is in accordance with Chaves

and Brown (1987) who found similar associations between External locus of control and Catastrophizing. Believing in chance as a major determinant of critical events in one's life has also been identified as having a strong relationship with Hypochondriasis (r=.34), Thinking Disorder (r=.35), and Deviation (r=.42). Perhaps a perceived lack of control over one's life situation results in generalized apprehensiveness which is reflected in pronounced catastrophizing ideation. Conversely, the tendency to catastrophize may result in generalized apprehensiveness and feelings of helplessness and alienation. The less extreme Powerful Others health locus of control beliefs were related to Deviation only (r=.38).

The present results only mildly support findings by Molinari and Khanna (1981) and Skevington (1983) who report a strong relationship between Chance beliefs and depressive symptoms and anxiety. In this study, the relationship displayed between Chance health locus of control and Depression was ambiguous (r=.29) and none was found with Anxiety.

One of the aims of the cognitive-behavioral treatment was to increase the patients' general feelings of self reliance and control over their pain and emotions. This goal was achieved, as demonstrated by the significant increase in Internal health locus of control beliefs and the concurrent decrease in Chance health locus of control beliefs. The fact that no significant change was observed in the Powerful Others health locus of control belief may support Rotter's (1966) assertion that the construct of locus of control represents a continuum of internality and externality rather than a dichotomy or trichotomy. In any event, the author does not view this lack of change in Powerful Others as detrimental. It is the author's contention that any beliefs by chronic pain patients that their

health can be controlled—even if it is dependent upon Powerful Others—is preferable to fatalistic beliefs that fate will take its course.

Emotional Distress

The present study found high levels of psychological distress among CLBP patients, as was evident by the elevated scores on measures of Hypochondriasis (Frequently concerned about being sick. Complains regularly of peculiar pains or bodily dysfunctions), Depression (Inclined to be down-hearted and show extreme despondency; considers self to be inadequate; listless, remote, and preoccupied; looks at the future pessimistically), Anxiety (Easily scared. Little things, even an idea, can cause a frenzy of anxiety. Afraid of novelty and the possibility of physical or interpersonal danger), Social Introversion (Avoids people. Has few friends. Seems to be uncomfortable when around others. Prefers asocial activities), Self Depreciation (Degrades self as being worthless, unpleasant, and undeserving. Generally expresses low opinion of self and refuses credit for any accomplishments), and Deviation (Displays behavior patterns very different from most people's. Admits to unusual and pathological characteristics).

These results support the conclusions of previous studies that chronic low back pain increases the risk of one displaying significant psychological disturbances including depression, anxiety, and somatic overconcern (Armentrout, Moore, Parker, Hewett, & Feltz, 1982; McCreary, Turner, & Dawson, 1981). A substantial amount of research has explained the possible relation between depressive disorders and chronic pain (Gupta, 1986). The preponderance of studies suggest that there is a considerable association between chronic pain and major depression (Romano & Turner, 1985). Depression has been viewed as a contributing cause of pain (Fishbein, Goldberg, Meagher, & Rosomoff, 1986), as a neurobiological companion

to pain (Gebhart, 1983), and as a consequence of inescapable chronic pain—that is depression results from learned helplessness and demoralization (Pelz & Merskey, 1982). According to Aronoff (1981), treatment of depression in chronic pain is an essential component of successful rehabilitation. An untreated major depression is likely not only to exacerbate the chronic pain but also to interfere with the success of other treatments for pain. Consideration of the various ways of conceptualizing the relation between chronic pain and depression has important implications for treatment. Cognitive-behavioral therapy is based on a model that views depression as resulting from faulty cognition about self and others and faulty beliefs about the future. The task of the therapy is to substitute alternative cognitive structures and to help the patient to become aware of psychosocial influences that affect his pain experiences. Applying the cognitive-behavioral principles to CLBP patients proved to be effective. As a result of the treatment, there was a significant decrement in Depression. In addition, treatment effect was also evident in the significant reduction in Anxiety, Social Introversion, and Self Depreciation. Garron and Leavitt (1983) suggest that the duration factor of chronicity of pain is significant, and they found positive correlation between the duration of pain and psychopathology. This study did not support their assertion. No relationships were found between the length of pain and any of the psychological variables. Length of pain was correlated only to Pain Affect (r=.37), Pain Evaluation (r=.39), and Pain Intensity (r=.34).

B. Conclusion

CLBP is a common health problem that afflicts a substantial proportion of the adult population and interferes with every aspect of their lives. As a clinical problem, chronic pain is inextricably intertwined with social, psychological,

economic, and cultural factors. It has been recognized that the intensity, duration, and frequency of CLBP are not a direct outcome of the degree locus or amount of organic tissue damage associated with the patient's injury. As was demonstrated, CLBP patients differed greatly from No-Pain subjects in their level of emotional distress, maladaptive coping strategies, and self-defeating beliefs and attribution of control. These deficiencies seem to trigger a vicious circle of uncontrollable pain, helplessness and emotional distress, difficulties in acquiring and exercising control, uncontrollable pain. Holzman, Turk and Kerns (1986) comment:

> More important than any specific technique is the general perspective that fosters patient responsibility, resourcefulness, and control; in short, this is a reconceptualization of the pain problem that is diametrically opposed to the typical view of pain as overwhelming and uncontrollable with the patient a passive and helpless victim. (p. 49)

The cognitive-behavioral therapy applied in this study proved to be a valuable intervention treatment. Its goal was to teach CLBP patients how to become active copers and how to self-regulate psychophysiological events contributing to pain. The goal was accomplished as the patients responded with less pain and much improved senses of well being. In view of the results of this study, cognitive-behavioral therapy deserves careful consideration as part of a comprehensive, multidisciplinary approach to the rehabilitation of the CLBP population.

C. Limitations of the Study

The present study has a number of limitations inherent in its design and methodology. The sample is restricted to chronic low back pain patients and therefore the generalizability of the results to other pain patients suffering from other types of pain syndromes is uncertain. The use of self-report measures only is a problem because of the lack of any objective criteria by which to evaluate

their validity for the sample. As Fordyce (1976) pointed out, there is often a discrepancy between what chronic pain patients say about how they are coping and what they actually do. Furthermore, the subjective impression of improvement may be influenced by patient and therapist expectancy effects (Rosenthal & Rosnow, 1969) and demand characteristics (Orne, 1962). However, the use of standardized and reliable measures in this study represent an improvement over some prior research in the area. As Folkman and Lazarus (1985) conclude, the problem is not that self-report is inherently more fallible than other methods of inquiry—in fact for certain kinds of psychological processes it may be the only way to obtain certain information—but rather that it ultimately requires verification by other methods such as observation of direct behavior and physiological assessment.

Without randomly assigned patients to control and experimental conditions, it is more difficult to determine whether post-treatment changes are due to active treatment factors or to nonspecific effects associated with the treatment and/or the measurement instruments and the repeated measurement process. The issue of patient self-selection for treatment or no-treatment potentially may be limiting to the generalizability of the findings from a research point of view. However, such limitation is a reality in all voluntary treatment programs. The exclusion of WCB recipients from treatment may have skewed the results to some degree, in view of research that has shown that patients receiving Worker's Compensation generally fare more poorly on treatment outcomes measures (Kleinke & Spangler, 1988; Keefe, Block, William, & Surwit, 1981; Painter, Seares, & Newman, 1980). The fact that most of the treatment patients were female (83%) may have some bearing on the generalizability of the results. This is again

part of the limitation of the self-selection design. The author, however, is not aware of any published study which connotes different treatment effects to the gender of chronic pain patients.

A major problem with most research on psychological distress, emotional factors, or personality in chronic pain is the tendency to analyze data from small groups of patients and yield composite profiles that foster an illusion of homogeneity. It is possible that the CLBP patient samples are not a true representation of the CLBP patient population. Finally, to determine if the treatment outcomes are maintained over time, a follow-up study over a longer period of time would be desired.

D. Suggestions for Future Research

For future research the question is no longer whether the cognitive-behavioral therapy is potent in facilitating adaptive responses, enhancing one's sense of well being, and attenuating the suffering of pain. The question is no longer "Does it work?" but "How well does it work, for whom, and why?" Experiments dealing with specific components of the program are needed to isolate and improve upon the effective ingredients. Experimental manipulation of treatment components such as sequential mantling or dismantling designs as well as single subject experiments may be of potential value in discarding the less effective components.

There is also a need for process as well as outcome measurement. If a treatment has been found to alleviate pain or decrease pain behaviors, by what means is it effective? For example, does cognitive-behavioral treatment alter pain report because patients experience less nociception, because they reinterpret noxious sensations, or because they simply modify their verbal pain descriptors?

What other changes in cognitive strategies or perception of control play a role in the improvement?

Another interesting set of questions arises regarding the interaction between spontaneous (self-generated) cognitive-behavior coping strategies during pain episodes. Is it more effective to enhance existing coping styles, or is it more effective to broaden the spectrum of the patient's coping repertoire by introducing new (and perhaps contradictory) strategies?

More randomized control group designs are needed, incorporating multivariate hierarchical clustering techniques to identify distinct homogeneous attributes and to widen the generalizability of the results.

Few studies look at long-term effects of treatment intervention. Well-controlled longitudinal studies with comprehensive assessment are needed in order to evaluate the treatment effects more reliably and to allow stronger conclusions about the durability of effects. Because of the variable nature of clinical pain over time, it is important to obtain baseline measures of pain prior to onset of treatment, regularly throughout treatment, and for a period of time following treatment.

Various forms of pathological process are usually labeled as CLBP. It would be interesting to differentiate subgroups with common symptoms and examine the differential effect of the cognitive-behavioral program.

The utility of the cognitive-behavioral approach should be researched with the acute low back pain population. Perhaps if such a learning model were applied early enough, some of the acute low back pain patients can be prevented from becoming CLBP patients and an emotional and economic drain on self, family, and society.

Considering the prevalence of emotional and marital disturbance experienced by spouses (Ahern, Adams, & Follick, 1985), assessment of CLBP patients should routinely involve spouses and evaluation of the functioning of the marriage. The emotional status of the spouse and the quality of the marital relationship may mediate the patient's response to treatment.

An important issue for future research is the optimal combination of medical and psychological interventions for CLBP patients. To date, such intervention may occur simultaneously, often with no theoretical base or systematic manner. It is essential to study what combination is most helpful to the patient, given the results of a comprehensive biopsychosocial assessment.

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APPENDIX A

INFORMATION SHEET

TITLE OF STUDY: Chronic Low Back Pain and Cognitive-Behavioral Therapy

PRINCIPAL INVESTIGATOR: Dr. L. Davis, Professor, Department of Surgery (492-6391)

CO-INVESTIGATORS: Dr. J. Beach, Director, Division of Clinical Psychology (492-6895)
Mr. R. Sela, Doctoral Psychology Intern (492-6896)

PURPOSE OF STUDY:

1. to find out how low back pain patients feel about themselves, their levels of pain, and their ways of coping with it.

2. to evaluate a treatment designed to teach low back pain patients different cognitive and behavioral techniques to better control and cope with their pain.

TASKS:

1. **Questionnaires:** If you agree to participate, please sign the consent form and complete the enclosed five questionnaires. The questions are checklists of statements or words, and you are asked to indicate to what extent the different statements or words apply to you. There are no right or wrong answers, and your name will not appear on the questionnaires. The estimated time for completion is approximately 90 minutes.

   After completing the questionnaires, please mail them back with the consent form (signed by you and a witness) in the pre-paid, addressed envelope.

2. **Treatment (optional):** This will consist of six 90-minute weekly group therapy sessions. These group therapy sessions will be held in the Division of Clinical Psychology, University of Alberta Hospital. Throughout the six sessions, you will learn different skills such as relaxation and how to use your own abilities to manage and control your pain. You will also be given instructed homework assignments designed to practice the different techniques.

   There is no charge to participants and there are no known adverse side-effects to this treatment. If you are interested in the therapy, please indicate it on the bottom of the consent form and Mr. Sela will contact you. Please note that we have only a limited number of seats.

CONFIDENTIALITY:

Any information pertaining to your questionnaires or treatment sessions will be kept confidential in a locked cabinet in the Division of Clinical Psychology, University of Alberta Hospitals. The signed consent form which is the only identifying document will be kept separately from the questionnaires.

WCB, insurance companies, or any other third parties will have absolutely no access to any information. **THIS STUDY IS STRICTLY CONFIDENTIAL.** Only the investigators will have access to the data. The results of the study may be published, but you will not be identified by name or in any way, and your name will not be associated with the study.

APPENDIX A_1

EXPLANATION SHEET

TITLE OF STUDY: Chronic Low Back Pain and Cognitive-Behavioral Therapy

PRINCIPAL INVESTIGATOR: Dr. L. Davis, Professor, Department of Surgery (492-6391)

CO-INVESTIGATORS: Dr. J. Beach, Director, Division of Clinical Psychology (492-6895)
Mr. R. Sela, Doctoral Psychology Intern (492-6896)

PURPOSE OF STUDY:

1. to find out how low back pain patients feel about themselves, their levels of pain, and their ways of coping with it.

2. to evaluate a treatment designed to teach low back pain patients different cognitive and behavioral techniques to better control and cope with their pain.

TASKS:

In order to establish a criterion against which to compare the chronic low back pain patients' responses, we are asking pain-free individuals to complete a similar series of questionnaires. If you are not suffering from any kind of persistent pain, long-term or life-threatening illness, we would greatly appreciate your cooperation.

If you agree to participate, kindly complete the enclosed five questionnaires. The questions are checklists of statements or words, and you are asked to indicate to what extent the different statements or words apply to you. There are no right or wrong answers, and please do not identify yourself by name or in any other way. The estimated time for completion is approximately 90 minutes. After completing the questionnaires, please mail them back in the pre-stamped, addressed envelope. If you choose not to participate, kindly return or mail back this package to the investigator. Should you have any question regarding the questionnaires or the study, please contact Mr. A. Rami Sela (492-6896) or Dr. L. Davis (492-6391).

CONFIDENTIALITY:

Any information pertaining to your questionnaires will be kept confidential in a locked cabinet in the Division of Clinical Psychology, University of Alberta Hospitals. Only the investigators will have access to the data. The results of the study may be published, but you will not be identified by name or in any way, and your name will not be associated with the study.

APPENDIX B

CONSENT FORM

TITLE OF STUDY: Chronic Low Back Pain and Cognitive-Behavioral Therapy

I acknowledge reading the research procedure described on the Information Sheet (attached) of which I have a copy. In addition, I know that I may contact the person designated on this form if I have questions either now or in the future. I have been assured that personal records relating to this study will be kept confidential. I understand that I am free to withdraw from the study at any time without jeopardy to my continuing medical care. I further understand that if the study is not undertaken, or if it is discontinued at any time, the quality of my medical care will not be affected. I understand that if any knowledge gained from the study is forthcoming that could influence my decision to continue in this study, I will be informed promptly.

I understand what is required of me and I freely agree to complete the attached five questionnaires (BIQ, MPQ, CSQ, MHLC, BPI).

The persons who may be contacted about the study are:

Dr. L. Davis
(492-6391)

Mr. A. Rami Sela
(492-6896)

_____
Patient's Name (please print)

_____
Patient's Signature

_____
Witness's Name (please print)

_____
Witness's Signature

_____
Date

Please indicate (X) if you wish to participate in the optional treatment:

yes ( ) no ( )

If yes, write a telephone number where you can be reached:

(H) _____ (W) _____

APPENDIX C

BASIC INFORMATION QUESTIONNAIRE

This questionnaire is designed to provide general information. Please read each question carefully, mark X in the appropriate category, or print your answers clearly.

1. Sex: ( ) Male
   ( ) Female

2. Age (in years): _____

3. How long have you had your back pain? Years _____ Months _____

4. How did your back pain begin?
   ( ) injury
   ( ) illness
   ( ) following an operation
   ( ) unknown cause
   ( ) other (explain) _____

5. Please check the category which represents your formal education:
   ( ) grade 8 or less
   ( ) partial high school (9 - 11 grades)
   ( ) high school diploma (12 - 13 grades)
   ( ) vocational, technical college
   ( ) partial university
   ( ) university degree
   ( ) advanced university degree
   ( ) other (describe) _____

6. What is your current employment status?
   ( ) employed full time
   ( ) employed part time
   ( ) homemaker
   ( ) self-employed
   ( ) currently on sick leave
   ( ) unemployed
   ( ) retired
   ( ) other (describe) _____

7. Are you presently receiving disability payments?
   ( ) no
   ( ) no, but under pending litigation
   ( ) yes, Workers' Compensation (WCB)
   ( ) yes, Canada Pension disability (CPP)
   ( ) yes, other (describe) _____

APPENDIX C_1

BASIC INFORMATION QUESTIONNAIRE (SHORT)

This questionnaire is designed to provide general information. Please read each question carefully, mark X in the appropriate category, or print your answers clearly.

1. Sex: ( ) Male
   ( ) Female

2. Age (in years): _____

3. Please check the category which represents your formal education:
   ( ) grade 8 or less
   ( ) partial high school (9 - 11 grades)
   ( ) high school diploma (12 - 13 grades)
   ( ) vocational, technical college
   ( ) partial university
   ( ) university degree
   ( ) advanced university degree
   ( ) other (describe) _____

4. What is your current employment status?
   ( ) employed full time
   ( ) employed part time
   ( ) homemaker
   ( ) self-employed
   ( ) currently on sick leave
   ( ) unemployed
   ( ) retired
   ( ) other (describe) _____

APPENDIX D

MCGILL PAIN QUESTIONNAIRE

A. *Some of the words below may describe what your pain feels like. Please check (X) the one word in each of the 20 word groups that best describes your pain during the last month. Leave out any word group if it does not apply to you.*

1	2	3	4
( ) Flickering	( ) Jumping	( ) Pricking	( ) Sharp
( ) Quivering	( ) Flashing	( ) Boring	( ) Cutting
( ) Pulsing	( ) Shooting	( ) Drilling	( ) Lacerating
( ) Throbbing	( ) Shocking	( ) Stabbing	
( ) Beating		( ) Lancinating	
( ) Pounding			

5	6	7	8
( ) Pinching	( ) Tugging	( ) Hot	( ) Tingling
( ) Pressing	( ) Pulling	( ) Burning	( ) Itchy
( ) Gnawing	( ) Wrenching	( ) Scalding	( ) Smarting
( ) Cramping		( ) Searing	( ) Stinging
( ) Crushing			

9	10	11	12
( ) Dull	( ) Tender	( ) Tiring	( ) Sickening
( ) Sore	( ) Taut	( ) Exhausting	( ) Suffocating
( ) Hurting	( ) Rasping		
( ) Aching	( ) Splitting		
( ) Heavy			

13	14	15	16
( ) Fearful	( ) Punishing	( ) Wretched	( ) Annoying
( ) Frightful	( ) Grueling	( ) Blinding	( ) Troublesome
( ) Terrifying	( ) Cruel		( ) Miserable
	( ) Vicious		( ) Intense
	( ) Killing		( ) Unbearable

17	18	19	20
( ) Spreading	( ) Tight	( ) Cool	( ) Nagging
( ) Radiating	( ) Numb	( ) Cold	( ) Nauseating
( ) Penetrating	( ) Drawing	( ) Freezing	( ) Agonizing
( ) Piercing	( ) Squeezing	( ) Icy	( ) Dreadful
	( ) Tearing		( ) Torturing

B. *Please indicate your present pain intensity:*

( ) **no pain**
( ) **mild**
( ) **discomforting**
( ) **distressing**
( ) **horrible**
( ) **excruciating**

APPENDIX D_1

MCGILL PAIN QUESTIONNAIRE (MODIFIED)

A. *Think of a situation when you experienced severe pain. Please check (X) the one word in each of the 20 word groups that best describes what your pain felt like. Leave out any word group that does not apply to you.*

1	2	3	4
( ) Flickering	( ) Jumping	( ) Pricking	( ) Sharp
( ) Quivering	( ) Flashing	( ) Boring	( ) Cutting
( ) Pulsing	( ) Shooting	( ) Drilling	( ) Lacerating
( ) Throbbing	( ) Shocking	( ) Stabbing	
( ) Beating		( ) Lancinating	
( ) Pounding			
5	**6**	**7**	**8**
( ) Pinching	( ) Tugging	( ) Hot	( ) Tingling
( ) Pressing	( ) Pulling	( ) Burning	( ) Itchy
( ) Gnawing	( ) Wrenching	( ) Scalding	( ) Smarting
( ) Cramping		( ) Searing	( ) Stinging
( ) Crushing			
9	**10**	**11**	**12**
( ) Dull	( ) Tender	( ) Tiring	( ) Sickening
( ) Sore	( ) Taut	( ) Exhausting	( ) Suffocating
( ) Hurting	( ) Rasping		
( ) Aching	( ) Splitting		
( ) Heavy			
13	**14**	**15**	**16**
( ) Fearful	( ) Punishing	( ) Wretched	( ) Annoying
( ) Frightful	( ) Grueling	( ) Blinding	( ) Troublesome
( ) Terrifying	( ) Cruel		( ) Miserable
	( ) Vicious		( ) Intense
	( ) Killing		( ) Unbearable
17	**18**	**19**	**20**
( ) Spreading	( ) Tight	( ) Cool	( ) Nagging
( ) Radiating	( ) Numb	( ) Cold	( ) Nauseating
( ) Penetrating	( ) Drawing	( ) Freezing	( ) Agonizing
( ) Piercing	( ) Squeezing	( ) Icy	( ) Dreadful
	( ) Tearing		( ) Torturing

B. Please indicate your present pain intensity:

( ) no pain
( ) mild
( ) discomforting
( ) distressing
( ) horrible
( ) excruciating

APPENDIX E

COPING STRATEGIES QUESTIONNAIRE

Listed below are things that people have reported doing, thinking, or feeling when they experienced pain. Please circle a number on the scale under each of the following statements which most closely reflects how you responded when you felt pain during the last month. The number 1 indicates that you never do that, a 4 indicates that you sometimes do that, and a 7 indicates that you always do that. Remember you can circle any number along the scale.

WHEN I FEEL PAIN...

1. **I try to feel distant from the pain, almost as if the pain was in somebody else's body.**

   1 2 3 4 5 6 7

   Never Sometimes Frequently

2. **I leave the house and do something, such as going to the movies or shopping.**

   1 2 3 4 5 6 7

3. **I try to think of something pleasant.**

   1 2 3 4 5 6 7

4. **I don't think of it as pain but rather as a dull or warm feeling.**

   1 2 3 4 5 6 7

5. **It's terrible and I feel it's never going to get any better.**

   1 2 3 4 5 6 7

6. **I tell myself to be brave and carry on despite the pain.**

   1 2 3 4 5 6 7

7. **I read.**

   1 2 3 4 5 6 7

8. **I tell myself that I can overcome the pain.**

   1 2 3 4 5 6 7

9. **I take my medication.**

   1 2 3 4 5 6 7

10. **I count numbers in my head or run a song through my mind.**

    1 2 3 4 5 6 7

11. **I just think of it as some other sensation, such as numbness.**

    1 2 3 4 5 6 7

WHEN I FEEL PAIN...

12. It's awful and I feel that it overwhelms me.

1	2	3	4	5	6	7
Never			Sometimes			Frequently

13. I play mental games with myself to keep my mind off the pain.

1	2	3	4	5	6	7

14. I feel my life isn't worth living.

1	2	3	4	5	6	7

15. I know someday someone will be here to help me and it will go away for awhile.

1	2	3	4	5	6	7

16. I walk a lot.

1	2	3	4	5	6	7

17. I pray to God it won't last long.

1	2	3	4	5	6	7

18. I try not to think of it as my body, but rather as something separate from me.

1	2	3	4	5	6	7

19. I relax.

1	2	3	4	5	6	7

20. I don't think about the pain.

1	2	3	4	5	6	7

21. I try to think years ahead, what everything will be like after I've gotten rid of the pain.

1	2	3	4	5	6	7

22. I tell myself it doesn't hurt.

1	2	3	4	5	6	7

23. I tell myself I can't let the pain stand in the way of what I have to do.

1	2	3	4	5	6	7

24. I don't pay any attention to it.

1	2	3	4	5	6	7

25. I have faith in doctors that someday there will be a cure for my pain.

1	2	3	4	5	6	7

WHEN I FEEL PAIN...

26. No matter how bad it gets, I know I can handle it.

1	2	3	4	5	6	7
Never			Sometimes			Frequently

27. I pretend it's not there.

1 2 3 4 5 6 7

28. I worry all the time about whether it will end.

1 2 3 4 5 6 7

29. I lie down.

1 2 3 4 5 6 7

30. I replay in my mind pleasant experiences in the past.

1 2 3 4 5 6 7

31. I think of people I enjoy doing things with.

1 2 3 4 5 6 7

32. I pray for the pain to stop.

1 2 3 4 5 6 7

33. I take a shower or a bath.

1 2 3 4 5 6 7

34. I imagine that the pain is outside of my body.

1 2 3 4 5 6 7

35. I just go on as if nothing happened.

1 2 3 4 5 6 7

36. I see it as a challenge and don't let it bother me.

1 2 3 4 5 6 7

37. Although it hurts, I just keep on going.

1 2 3 4 5 6 7

38. I feel I can't stand it anymore.

1 2 3 4 5 6 7

39. I try to be around other people.

1 2 3 4 5 6 7

40. I ignore it.

1 2 3 4 5 6 7

41. I rely on my faith in God.

1 2 3 4 5 6 7

WHEN I FEEL PAIN...

42. I feel like I can't go on.

1	2	3	4	5	6	7
Never			Sometimes			Frequently

43. I think of things I enjoy doing.

1	2	3	4	5	6	7

44. I do anything to get my mind off the pain.

1	2	3	4	5	6	7

45. I do something I enjoy, such as watching TV or listening to music.

1	2	3	4	5	6	7

46. I pretend it's not a part of me.

1	2	3	4	5	6	7

47. I do something active, like household chores or projects.

1	2	3	4	5	6	7

48. I use a heating pad.

1	2	3	4	5	6	7

49. Based on all the things you do to cope or deal with your pain, on an average day, how much control do you feel you have over it? Please circle the appropriate number. Remember, you can circle any number along the scale.

1	2	3	4	5	6	7
No control			Some control			Complete control

50. Based on all the things you do to cope or deal with your pain, on an average day, how much are you able to decrease it? Please circle the appropriate number. Remember, you can circle any number along the scale.

1	2	3	4	5	6	7
Can't decrease it at all			Can decrease it somewhat			Can decrease it completely

APPENDIX E_1

COPING STRATEGIES QUESTIONNAIRE (MODIFIED)

Listed below are things that people have reported doing, thinking, or feeling when they experienced pain. Please circle a number on the scale under each of the following statements which most closely reflects how you respond when you feel pain. The number 1 indicates that you never do that, a 4 indicates that you sometimes do that, and a 7 indicates that you always do that. Remember you can circle any number along the scale.

WHEN I FEEL PAIN...

1. I try to feel distant from the pain, almost as if the pain was in somebody else's body.

1 2 3 4 5 6 7

Never Sometimes Frequently

2. I leave the house and do something, such as going to the movies or shopping.

1 2 3 4 5 6 7

3. I try to think of something pleasant.

1 2 3 4 5 6 7

4. I don't think of it as pain but rather as a dull or warm feeling.

1 2 3 4 5 6 7

5. It's terrible and I feel it's never going to get any better.

1 2 3 4 5 6 7

6. I tell myself to be brave and carry on despite the pain.

1 2 3 4 5 6 7

7. I read.

1 2 3 4 5 6 7

8. I tell myself that I can overcome the pain.

1 2 3 4 5 6 7

9. I take my medication.

1 2 3 4 5 6 7

10. I count numbers in my head or run a song through my mind.

1 2 3 4 5 6 7

11. I just think of it as some other sensation, such as numbness.

1 2 3 4 5 6 7

WHEN I FEEL PAIN...

12. It's awful and I feel that it overwhelms me.

1 2 3 4 5 6 7

Never Sometimes Frequently

13. I play mental games with myself to keep my mind off the pain.

1 2 3 4 5 6 7

14. I feel my life isn't worth living.

1 2 3 4 5 6 7

15. I know someday someone will be here to help me and it will go away for awhile.

1 2 3 4 5 6 7

16. I walk a lot.

1 2 3 4 5 6 7

17. I pray to God it won't last long.

1 2 3 4 5 6 7

18. I try not to think of it as my body, but rather as something separate from me.

1 2 3 4 5 6 7

19. I relax.

1 2 3 4 5 6 7

20. I don't think about the pain.

1 2 3 4 5 6 7

21. I try to think years ahead, what everything will be like after I've gotten rid of the pain.

1 2 3 4 5 6 7

22. I tell myself it doesn't hurt.

1 2 3 4 5 6 7

23. I tell myself I can't let the pain stand in the way of what I have to do.

1 2 3 4 5 6 7

24. I don't pay any attention to it.

1 2 3 4 5 6 7

25. I have faith in doctors that someday there will be a cure for my pain.

1 2 3 4 5 6 7

WHEN I FEEL PAIN...

26. No matter how bad it gets, I know I can handle it.

1	2	3	4	5	6	7
Never			Sometimes			Frequently

27. I pretend it's not there.

1	2	3	4	5	6	7

28. I worry all the time about whether it will end.

1	2	3	4	5	6	7

29. I lie down.

1	2	3	4	5	6	7

30. I replay in my mind pleasant experiences in the past.

1	2	3	4	5	6	7

31. I think of people I enjoy doing things with.

1	2	3	4	5	6	7

32. I pray for the pain to stop.

1	2	3	4	5	6	7

33. I take a shower or a bath.

1	2	3	4	5	6	7

34. I imagine that the pain is outside of my body.

1	2	3	4	5	6	7

35. I just go on as if nothing happened.

1	2	3	4	5	6	7

36. I see it as a challenge and don't let it bother me.

1	2	3	4	5	6	7

37. Although it hurts, I just keep on going.

1	2	3	4	5	6	7

38. I feel I can't stand it anymore.

1	2	3	4	5	6	7

39. I try to be around other people.

1	2	3	4	5	6	7

40. I ignore it.

1	2	3	4	5	6	7

41. I rely on my faith in God.

1	2	3	4	5	6	7

WHEN I FEEL PAIN...

42. I feel like I can't go on.

1	2	3	4	5	6	7
Never			Sometimes			Frequently

43. I think of things I enjoy doing.

1	2	3	4	5	6	7

44. I do anything to get my mind off the pain.

1	2	3	4	5	6	7

45. I do something I enjoy, such as watching TV or listening to music.

1	2	3	4	5	6	7

46. I pretend it's not a part of me.

1	2	3	4	5	6	7

47. I do something active, like household chores or projects.

1	2	3	4	5	6	7

48. I use a heating pad.

1	2	3	4	5	6	7

49. Based on all the things you do to cope or deal with your pain, on an average day, how much control do you feel you have over it? Please circle the appropriate number. Remember, you can circle any number along the scale.

1	2	3	4	5	6	7
No control			Some control			Complete control

50. Based on all the things you do to cope or deal with your pain, on an average day, how much are you able to decrease it? Please circle the appropriate number. Remember, you can circle any number along the scale.

1	2	3	4	5	6	7
Can't decrease it at all			Can decrease it somewhat			Can decrease it completely

APPENDIX F

MULTIDIMENSIONAL HEALTH LOCUS OF CONTROL QUESTIONNAIRE

Listed below are some different ways of thinking about health and illness. Please circle a number, on the scale under each of the following statements, which most closely reflects how strongly you agree or disagree with the statement. The number 1 indicates that you strongly disagree, a 4 indicates that you feel neutral (neither agree nor disagree), and a 7 indicates that you strongly agree. Remember you can circle any number along the scale.

1. If I become sick, I have the power to make myself well again.

1	2	3	4	5	6	7
Strongly Disagree			Neutral			Strongly Agree

2. Often I feel that no matter what I do, if I am going to get sick, I will get sick.

1 2 3 4 5 6 7

3. If I see an excellent doctor regularly, I am less likely to have health problems.

1 2 3 4 5 6 7

4. It seems that my health is greatly influenced by accidental happenings.

1 2 3 4 5 6 7

5. I can only maintain my health by consulting health professionals.

1 2 3 4 5 6 7

6. I am directly responsible for my health.

1 2 3 4 5 6 7

7. Other people play a big part in whether I stay healthy or become sick.

1 2 3 4 5 6 7

8. Whatever goes wrong with my health is my own fault.

1 2 3 4 5 6 7

9. When I am sick, I just have to let nature run its course.

1 2 3 4 5 6 7

10. Health professionals keep me healthy.

1 2 3 4 5 6 7

11. When I stay healthy, I'm just plain lucky.

1 2 3 4 5 6 7

12. My physical well-being depends on how well I take care of myself.

1 2 3 4 5 6 7

13. **When I feel ill, I know it is because I have not been taking care of myself properly.**

1	2	3	4	5	6	7
Strongly Disagree			Neutral			Strongly Agree

14. **The type of care I receive from other people is what is responsible for how well I recover from an illness.**

1 2 3 4 5 6 7

15. **Even when I take care of myself, it's easy to get sick.**

1 2 3 4 5 6 7

16. **When I become ill, it's a matter of fate.**

1 2 3 4 5 6 7

17. **I can pretty much stay healthy by taking good care of myself.**

1 2 3 4 5 6 7

18. **Following doctor's orders to the letter is the best way for me to stay healthy.**

1 2 3 4 5 6 7

APPENDIX G

CHRONIC LOW BACK PAIN COGNITIVE-BEHAVIORAL TREATMENT

PARTICIPANT EVALUATION FORM

Your feedback about the treatment program is very valuable. Please read the following statements and indicate the extent to which you agree or disagree with them. For each statement circle the number which most clearly reflects your thinking. The categories on the scale are:

1 Strongly disagree
2 Disagree
3 Mildly disagree
4 Neutral
5 Mildly agree
6 Agree
7 Strongly agree

1. The Treatment program was helpful.

1	2	3	4	5	6	7
Strongly Disagree						Strongly Agree

2. The Treatment program was useful.

1	2	3	4	5	6	7
Strongly Disagree						Strongly Agree

3. The handout material was relevant.

1	2	3	4	5	6	7
Strongly Disagree						Strongly Agree

4. The Treatment program helps me to cope better with my pain.

1	2	3	4	5	6	7
Strongly Disagree						Strongly Agree

5. The therapist showed understanding of group members and their problems.

1	2	3	4	5	6	7
Strongly Disagree						Strongly Agree

6. The therapist listened carefully to what was said and accepted members as they are.

1	2	3	4	5	6	7
Strongly Disagree						Strongly Agree

7. The therapist helped members feel they are worthwhile persons with potential.

1	2	3	4	5	6	7
Strongly Disagree						Strongly Agree

8. The therapist encouraged members to become more self-reliant.

1	2	3	4	5	6	7
Strongly Disagree						Strongly Agree

9. Overall, I would rate the therapist as

1 very unhelpful
2 unhelpful
3 somewhat unhelpful
4 neutral
5 somewhat helpful
6 helpful
7 very helpful

10. If a good friend who suffers from chronic back pain asked me about this treatment program, I would

1 strongly recommend against it
2 recommend against it
3 not recommend it
4 neutral
5 recommend it with some reservation
6 recommend it
7 strongly recommend it

11. Your comments about the program:

12. Your suggestions for improvement:

APPENDIX H

SESSION #1: RECONCEPTUALIZATION OF PAIN

In this session I would like to discuss some of the characteristics of pain and the nature of our program. But first I wish to start with some common myths associated with pain:

1. "Seeing is believing" myth

When it comes to pain, unfortunately, there are many (including medical doctors) who believe that "If you can't see it, it isn't there." Most of us think of pain in terms of symptoms of injury or disease. We automatically assume that pain indicates bodily harm. So, if you complain of pain for which there is no obvious diagnosis—no illness, injury, or body damage—many people will quickly question the seriousness of your pain because they cannot see evidence of it.

In general, the relationships between injury and pain hold true—a pinched finger produces mild pain; a door slammed on a finger produces excruciating pain. But there are many instances where the relationship fails to hold up. Injuries often occur without pain. For example, about 65 percent of soldiers who are severely wounded in battle and 20 percent of civilians who undergo major surgery report feeling little or no pain for hours, even days after injury. In contrast, no apparent injury can be detected in about 70 percent of people who suffer from chronic low back pain. Pain can occur without injury—and injury without pain.

2. "Learn to live with it" myth

The advice "Learn to live with it" can be the most destructive that a doctor can give a patient. These words often produce a sense of helplessness, hopelessness, and giving up.

But you don't have to be resigned to your fate and learn to live with your pain. In fact, many chronic low back pain patients who were told by their doctors that they had to learn to live with it actually learned how to live "without it" in programs like ours—programs that taught them how to use their own resources to reduce their pain and minimize their suffering.

3. Pain as punishment myth

Many people have been raised with religious or philosophical beliefs that their pain is a punishment for sin or bad behavior. Some actually believe that their suffering will, in the long run, make them better people. This is a very unfortunate notion, because seeing pain as punishment creates guilt and feelings of inadequacy which serve only to worsen the pain and the emotional anguish.

How Pain Works

Now that we have touched on the major myths surrounding pain--and in particular chronic pain—I would like to review how pain works. This will also set the stage for explaining the self-management, cognitive-behavioral methods of controlling pain.

The first truly scientific theory about how pain worked was developed by Rene Descartes in the seventeenth century. His idea was that pain operates as an emergency alarm signal, travelling from the site of the injury through a single pain pathway to warn the "pain center" in the brain of damage or harm. Descartes' simple theory has greatly influenced our thinking about pain and has survived the last three hundred years with few modifications.

Acute and Chronic Pain

Descartes' theory can be very helpful in explaining the differences between acute and chronic pain by way of analogy with your car. Let's say that you get into your car and start the engine. If you have a reasonably newer model, a signal or a computerized voice is likely to remind you to fasten your seat belt. Now, acute pain is like that reminder—a warning signal. You fasten your seat belt or heal the injury and the warning signal stops. But what if the signal or voice continues long after you have buckled up and it cannot be silenced? Chronic pain is like driving all day with a loud buzzer signal that cannot be stopped. For some reason the pain control mechanism remains activated even when the message is no longer useful and the message itself becomes the major irritant.

Chronic pain is defined as pain that persists for six months or more and involves both physical and psychological suffering.

Pain is All in your Brain

Many of you may have felt that some of the specialists you have consulted have implied or actually said that because they cannot help you with your pain by some medical procedure, it is "all in your head." The fact is that indeed pain

is always in the head, or in the brain to be exact. The brain is the "control center." The nerve endings, which are found in all body tissues except the hair and nails, pick up pain signals such as, for example, a pinprick. All the pain signals then are transmitted to the brain in the form of nerve messages for interpretation, and only the brain can make them feel like pain. This is true whether you have just stubbed your toe or have had continuous backache.

For example, when we stub a toe, the brain first receives a hurt or nerve signal from the toe. Then, only if the brain decides to translate these signals into pain sensations, will we feel the pain as if it were back in our toe.

The Pain-Gate Theory

In modern pain theory, the central idea is that pain signals on their way up to the brain must pass through a "gate" mechanism in the spinal cord. When the gate is open, pain signals can pass through to the brain and make their impact. When the gate is closed, for whatever reason, the pain signals are blocked from reaching the brain. Furthermore, since only so much information can pass through the gate at any time, the pain signals must compete for a pass at the gate with a wide range of sensory messages (like temperature and pressure) which try to reach the brain too along with nerve messages coming down from the brain. These competing sensations can change not only the amount but also the intensity of the pain signals that go through the gate.

Experts now identify a wide range of physical, emotional, and mental factors that can influence the opening or closing of the gate to pain signals which are trying to reach the brain for interpretation.

The types of factors that are known to open the gate and let more and stronger pain signals to pass are:

1. Physical Factors
   (a) extent of the injury or degenerative changes
   (b) muscle tension and inappropriate activity level
2. Emotional Factors

   anxiety, worry, tension, anger, depression (these factors may be provoked by pain itself and/or by other life stresses)
3. Mental Factors
   (a) degree of focusing on the pain
   (b) boredom (often due to reduced involvement and activities because of the pain)

(c) negative beliefs and attitudes about the meaning of pain

(d) lack of sense of control over pain

Factors that close the gate and let fewer pain signals pass are:

1. Physical Factors

(a) medication (sedatives, anti-inflammatories, analgesics, etc.)

(b) counterstimulation (heat, massage, transcutaneous neural stimulation, acupuncture)

(c) moderate physical activity level

2. Emotional Factors

(a) relaxation and calmness

(b) positive emotions (e.g. contentment and high self-esteem)

3. Mental Factors

(a) attention diversion (focusing attention and imagery)

(b) interest and involvement in life activities

(c) positive attitudes and optimism

(d) sense of control over pain

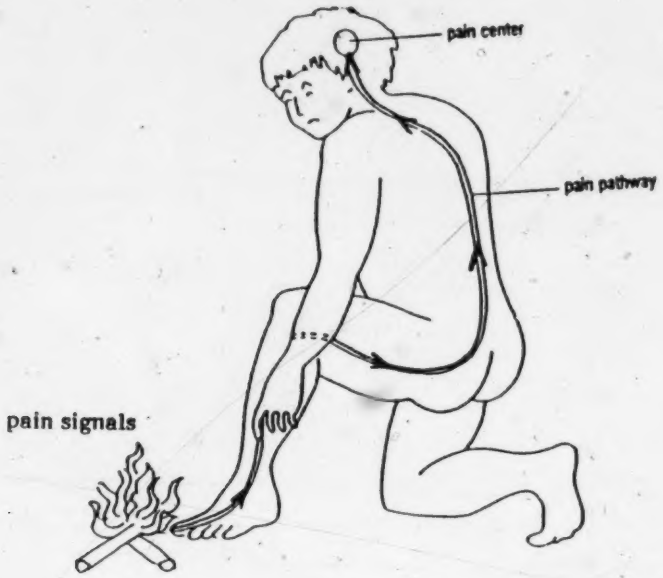
The Program

In this program we will teach you alternative ways to gain control over your pain by your own actions. You will learn how to "close the gate" to reduce the sensations of pain and minimize your discomfort by using your own resources. All of you can substantially reduce your pain. Most of you will be able to increase the range of activities you can comfortably perform, and almost all of you will feel better emotionally. The self-management approach that you will learn will lead to gradual and steady improvement, but it is not a quick-fix, magical cure. You will have to put time and effort into practicing the different coping skills to achieve the desired results. But if you do so, your rewards will far outweigh your efforts.

In the six weekly sessions we will teach you how to relax, how to increase your activity level, and how to use different techniques to become more an "active coper" and less a "passive victim." When you finish the six-week program, you will have made a big start and will continue improving afterward. I would like you to see these sessions as a beginning of a new way of dealing with your back pain—slow and gradual but persistent and unyielding.

APPENDIX J

TRADITIONAL VIEW OF PAIN (DESCARTES' MODEL)



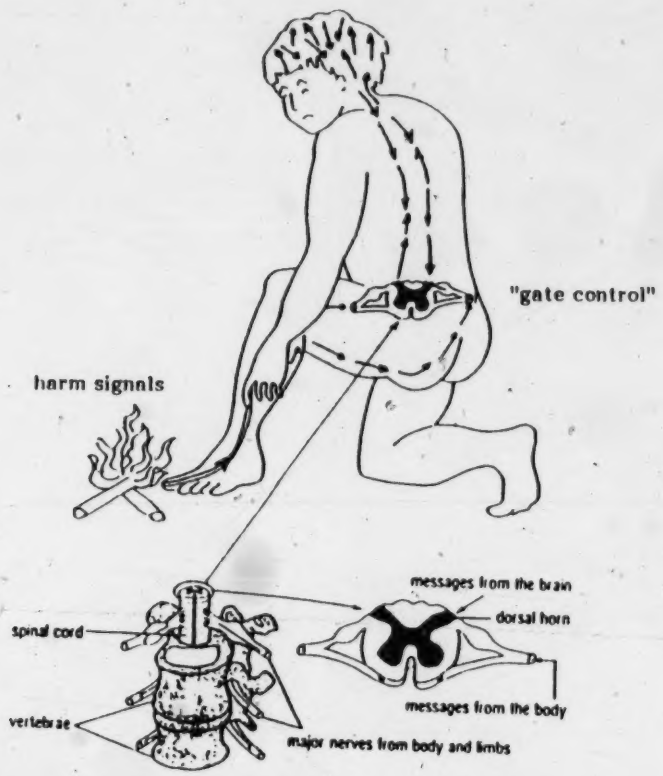
1. The injured part sends pain signals which travel uninterrupted directly to the brain along a simple, one-way path.

2. All the pain signals are automatically recorded as pain sensation, once they reach the pain center in the brain.

3. Pain is only a signal of body injury and there is always a one-to-one relationship between the degree of damage and the intensity of the pain: that is, minor injury = mild pain; serious injury = severe pain

APPENDIX K

CONTEMPORARY VIEW OF PAIN (GATE CONTROL THEORY)



1. The injured part sends harm signals (which are transmitted by different sets of nerve fibers, and along different pathways) to the brain. On their way up, harm signals must pass through a "gate" in the spinal cord. Once they reach the "gate," (a) harm signals must compete for entry with an endless flow of other incoming sensory information from every part of the body, trying to reach the brain too. (b) the harm signals' upward passage can also be accelerated or blocked by downward messages from the brain which can "open" or "close" the "gate."

2. Harm signals which pass through the "gate" spread throughout the brain, and they are not automatically recorded as pain. The brain may or may not translate them into pain sensations, depending on what else is happening in the body and the emotions, thoughts, beliefs, attitudes, and behavior of the individual at that time.

3. There is no one-to-one relationship between the severity of body injury (or damage) and the intensity of pain felt. It is possible to have injury without pain and pain without injury or diagnosed body damage.

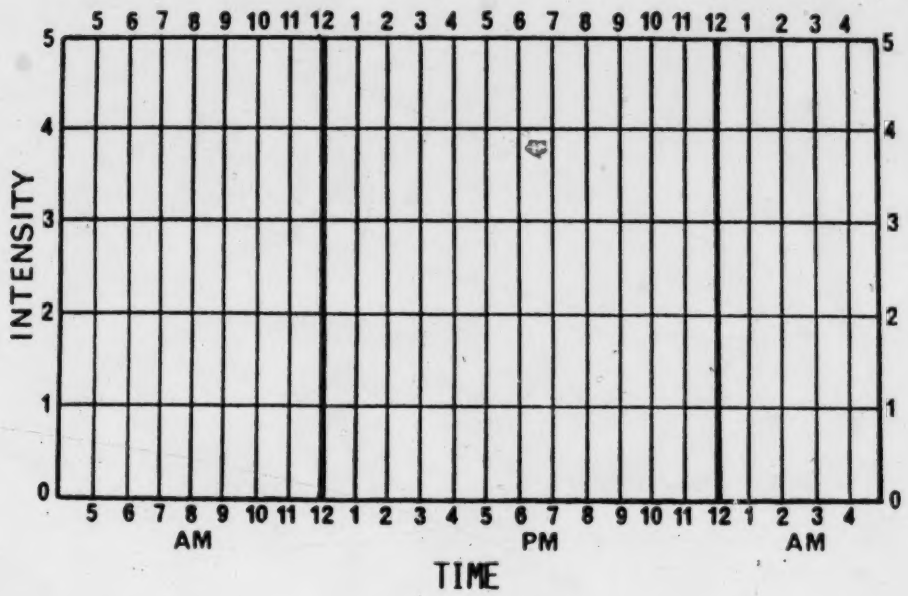
APPENDIX L

ONE-DAY PAIN CHART

Name _____ Date _____

A. Please mark (X) your pain intensity for every waking hour:

0 = no pain
1 = mild pain
2 = discomforting pain
3 = distressing pain
4 = horrible pain
5 = excruciating pain



B. Average pain intensity =

$$\frac{\text{(Pain intensity 1 x no. of hours) + ... (Pain intensity 5 x no. of hours)}}{\text{total number of waking hours}} =$$

= _____ =

C. Number of hours slept at night _____

APPENDIX M

MONTHLY GOAL PLANNING

NAME _____ MONTH _____

A. Work/task related activities

1. _____
2. _____ _____
3. _____

B. Pleasurable/leisure activities

1. _____
2. _____
3. _____

C. Fitness/exercise activities

1. _____
2. _____
3. _____

D. Social activities

1. _____
2. _____
3. _____

E. Other activities

1. _____
2. _____
3. _____

APPENDIX N

SESSION #2(a): DEEP BREATHING

The first thing you are going to learn is how to relax. Relaxation is the key to our pain control program. (How and why it works we will discuss next session.) This time, I would like to start with the foundation of any relaxation technique—deep, slow breathing, which is the easiest physiological system to control.

When we are tense or upset, our breathing becomes shallow and irregular and our heart rate tends to accelerate. When we are relaxed, our breathing deepens and our heart rate decelerates. Deep breathing is healthful: it increases the amount of oxygen in the blood and strengthens weak abdominal and intestinal muscles. It slows the bodily processes, lowers arousal, and in turn reduces tenseness and pain.

The method of deep, slow breathing is a simple skill that most patients can learn with little practice. They find it very beneficial in quickly inducing relaxation and in calming themselves. Once you begin to associate taking deep breaths with feeling relaxed, you can learn to start breathing deeply and slowly at the first indication of a pain episode. This in turn triggers a relaxation state which can help you prevent or reduce the pain and melt away the tension.

Now take a moment to practice the art of deep, slow breathing. Allow your attention to focus on your breathing.

(1) Inhale—take a deep, full breath through your nose, filling your lungs slowly with fresh air, while you count mentally from 1 to 4.

(2) Hold—hold your breath while you count mentally from 1 to 4. Feel the tenseness across the top of your chest and throughout the upper portion of your body.

(3) Exhale—bring forth a sense of relaxation by slowly exhaling through your mouth. Part your lips slightly and let the air out while counting from 1 to 8. As you exhale fully and completely, feel all the tension leaving your body, melting away with the warm air.

Repeat this cycle: In (nose, count of 4); hold (count of 4); out (mouth, count of 8) four times. If, while exhaling, you run out of breath before reaching number 8, on the second try take a deeper breath and exhale more slowly. If you find

it difficult to count mentally with your eyes open, try to close them gently. Don't be confined by a rigid pattern—do what feels right to you.

Don't wait for a stressful event to practice this deep breathing exercise. Do these deep, slow breaths in sequences of four each time as often as you can during the day, and you'll be surprised to discover how quickly your tension melts away.

After each sequence of four deep breaths, allow your breathing to find its natural, steady, effortless rhythm. Breathe evenly and easily, enjoying the pleasurable sensation of relaxation that you have been able to bring forth. Notice any differences in feelings you may have at the end of the breathing exercise compared to those you were having when you began. Essentially, the difference is a result of your own ability to control your body. You can slow your body down and voluntarily relax.

You can deepen your relaxation by thinking silently to yourself the words "relax," "calm," or "peace" as you slowly exhale. Choose a word that you like and that helps you feel relaxed and pleasant. Say your word silently to yourself or even picture it in your mind as you slowly let out the breath through your mouth. If you notice that your mind has wandered and you are thinking about something besides relaxing, don't worry about that. This is natural. Everyone's mind wanders sometimes, even when we are relaxed. Just bring your attention back to your breathing and repeat your relaxing word each time you breathe out.

APPENDIX O

SESSION #2(b): DAILY ACTIVITY

The normal response to pain is to stop any activity that causes pain. Consequently, most people who suffer from chronic pain find that their daily activities (and often their whole lives) are controlled and dictated by their pain.

Having one's life controlled by pain is a frustrating experience, and that's why most chronic pain patients try to fight back. Unfortunately, they often do it in a very sporadic way, pushing themselves physically too hard, and they end up paying for it by feeling worse.

Let's look at a typical example. Suppose your back has been particularly bad lately and causing you great discomfort. You become increasingly frustrated by your inability to tackle a backlog of things to do (e.g. household chores) that have built up during the bout of pain. You decide to "grin and bear it" and get the job done, and you plunge into the workpile wholeheartedly in order to catch up. You spend the rest of the day tackling each job energetically, feeling satisfied that you are finally taking charge. By 4 p.m. you start noticing some strong twinges in your back, and by that evening you are in trouble and rummaging in the medicine cabinet for something strong. After a night of poor sleep, you spend the next day back in bed, angry that even one day of "normal" activity is more than you can cope with. After a few similar experiences, you are likely to become conditioned by this pain/activity association. Consequently, you learn to avoid activities in order to spare yourself the inevitable pain. Eventually you may even give up these activities altogether. How can you begin to undo this damaging pain/activity association and still get to the top? There are three key behavioral techniques that can help you to resume your normal activities safely: baselines, shaping, and pacing.

Baseline is a measure of the amount of activity that one can perform until there is a noticeable pain increase. Suppose you have decided to become more active and take long walks. First you must establish a baseline for your walk. Begin by noting the time when you set out on your walk. Walk at a normal, comfortable pace until you first become aware of an increase in pain. At this point stop! Again note the time to determine how long you walked until the pain increase occurrred. The total time elapsed becomes your baseline.

Suppose that at the outset you could walk for ten minutes before experiencing an increase in pain. Ten minutes is then your baseline. To be on the safe side, you should reduce your next walk by half of your baseline (or five minutes in the example). You know almost certainly that you will be able to walk half of your baseline without an increase in pain. Here you can enjoy a planned activity that is not associated with an increase in pain.

Shaping is the process of gradually increasing the amount of an activity on the basis of a preplanned schedule. Using again the five minutes (half baseline) example, begin by taking several walks a day for five minutes each. This means walk out of the house for two and a half minutes and then return home. After a few days, you can increase the walking time slightly (e.g. a minute in total). Allow yourself two to three weeks to gradually build your walks back up to ten minutes—your baseline.

The key thing is persistence, consistence, and patience. If you are in more pain one day and feel like staying home, don't. Don't break the routine—continue the scheduled walks. On the other hand, if you feel terrific, as if you could walk for an hour, don't. You should resist the temptation and hold yourself to the allotted time. If you shape too quickly, you run the risk of encountering additional pain and falling back into the old routine of having the pain control your behavior. Take your time. Two or three weeks to baseline is reasonable in most cases.

The point is that if you change your activities according to your pain (or lack of it), the pain is still in control. On the other hand, if you adhere to your safe, preplanned, scheduled routine, you are in control. Remember, your goal is not just to finish the activity but also to break the link between your activity and your pain.

How far should you shape your activity? The answer is highly dependent upon your individual circumstances; but as long as you maintain the shaping principles faithfully and engage in regular routine, you should be able to greatly extend your ability to perform the activity. Usually you can exceed your original baseline without too much trouble and keep going until you reach a new level of functioning which you can maintain without any signs of discomfort. Remember, the key to success with this approach is to take it slowly and systematically and not overdo it.

Pacing is the process of controlling activities based upon predetermined schedules as opposed to having those activities controlled by pain. The general principles of pacing can be applied to any activity a person may engage in. In each case, first you must follow the principles of baseline and shaping: that is establish the baseline, reduce the amount by half, and then shape it slowly until you reach a new plateau of functioning and comfort.

Once you reach such a plateau, you must pace yourself according to a predetermined schedule that is not dictated by changes in pain. For example, if you reach a plateau in driving of 30 minutes (that is 30 minutes of continuous driving before having increased back pain), then remember to stop and take a break in 30-minute intervals. If you can't sit at your desk for more than one hour at a time, then be sure to plan your work day so that you can get up and do something else every hour—before the pain forces you to.

The crucial principle here is not to wait until the pain builds up to the point that it forces you to do something. Always plan ahead so that you are preventing the increase in pain and staying in control. Once your pain flares up, it is much harder to bring it under control.

Scheduling

We suggest that you look at pacing as a whole new way of controlling your life and your pain. You can adopt a pain-independent lifestyle by scheduling all your daily activities from the time you wake up in the morning until the time you go to bed at night. This scheduling is based on your own plans, not pain. You can try a three-point scheduling system to follow each day:

1. Each evening, prepare a schedule for the following day. Decide the night before what time you will arise in the morning and what your activities will be. You must be very careful in establishing realistic expectations of yourself. Don't get carried away and bite off more than you can chew. Take into account your baseline and levels of functioning. Be sure that you can accomplish all of your goals the next day, even if it turns out to be a "bad" day in terms of pain.

2. Be sure to schedule rest periods during the day and take them at the specified times. Rest breaks can become quality periods that you can spend in reading or relaxation. The one thing we discourage during these breaks is taking naps, because sleep during the day can interfere with normal nighttime sleeping patterns.

Taking a break is not a sign of weakness or failure; it is a wise move to allow you to gradually build up your conditioning. As you improve, you may be able to reduce the number and duration of your rest periods.

3. Use a daily time sheet marked into hours. Make sure all the time periods in the day are filled with activities and rest periods. When you finish filling it in the night before, every minute of the day should be accounted for. This encourages you to be time-oriented rather than pain-oriented and leaves less time to focus on discomfort.

Scheduling is one of those things that is easier said than done, particularly if you are not a person who can change habits and lifestyle smoothly. But scheduling is vital in your gaining control over your chronic pain syndrome. Don't get discouraged if your first attempts at scheduling are not completely successful. It takes some practice, and eventually you'll get it right. Once scheduling becomes a habit, you will find it easier to do and the rewards will make it all worthwhile.

APPENDIX P

DAILY ACTIVITIES SCHEDULE

NAME _____ DATE _____

Time	Activity	Mood
AM		
PM		

APPENDIX Q

SESSION #3: RELAXATION

As the pain becomes a constant irritant, people develop permanently elevated levels of tension in specific muscles (e.g. trapezium or back exterior muscles). In addition to muscular tension, pain also triggers anxiety and frustration which make the pain even worse. All in all, a vicious circle develops when pain causes muscular tension and anxiety which results in even greater pain sensation.

One of the most effective ways to break the pain's vicious circle is by learning to relax various parts of your body at will—quickly and deeply. The kind of relaxation that you will learn is not like the relaxation when you sit in front of the TV or are asleep. You will actually relax yourself while you remain alert and in control all the time.

How Does Relaxation Work?

There are a number of ways by which relaxation helps to reduce the amount of pain one experiences.

1. Relaxation helps to create feelings of emotional calmness which close the pain gate, in contrast to feelings of anxiety and frustration which open the gate.

2. It helps control muscular tension. Relaxation is incompatible with tension—you cannot physically relax and at the same time tighten your muscles. Therefore relaxation reduces the amount of pain that is directly caused by muscle tension.

3. Our brain is capable of paying primary attention to only one thing at a time. When you are experiencing pain, it takes a lot of concentration to stay relaxed. As a result, while you are concentrating on relaxing, you have little attention left over to experience the pain. Now, you may still feel your pain to some extent or be aware that it is there, but the pain is likely to be removed to the background and be less disturbing.

4. Relaxation helps with sleep disturbance that often affects one's capacity to tolerate pain. Many patients find it harder to cope with pain when they are tired.

5. Relaxation helps the body release its own natural pain-killers (endorphins).

Now you may be thinking, "Sure! Relax! That's easy to say. Just try to relax when you are in severe pain. Relaxing is the last thing you feel like doing. All you can do is tense up and try not to scream." You are right, of course. It isn't usually quite so simple to "relax" under such difficult circumstances. It isn't simple, but it is possible to relax even under the most uncomfortable and painful conditions (e.g. childbirth).

All in all, relaxation is a skill, and like any other skill it has to be learned. This takes time and practice. For some people, it comes easily and they pick up the basic technique fairly quickly; others may require more time. But all need to practice regularly in order to master relaxation. With practice, everyone is capable of relaxing himself or herself.

Progressive Muscle Relaxation

There are many ways to relax, and you may already have tried some relaxation techniques like T.M., yoga, or biofeedback. Most people who suffer from prolonged pain find it easier to relax little by little than all at once. Thus, in the two progressive muscle relaxation techniques that we have developed for this program, you will learn to relax the muscles in your body, one group at a time.

1. Active Relaxation

In active progressive muscle relaxation, you tense and relax your muscles intentionally. This involves three steps:

(a) turning your attention to the muscle to be relaxed

(b) tension-tightening (as you inhale, you tense your muscles slightly and zero in on the tension)

(c) tension-releasing (as you exhale, you release the muscle tension and feel it leaving your body with the warm breath)

2. Passive Relaxation

In passive muscle relaxation, you relax your muscles without first tightening them up intentionally. Basically, you just lie back and don't try to make anything happen. The important factors in this technique are:

(a) the slow progression from one part of the body to another

(b) pausing to focus on the various body parts while in a state of passive attention

(c) controlled breathing and use of words and images to induce deep relaxation.

Passive relaxation is very suitable for falling asleep.

Both techniques are equally effective and they take 20 minutes each. The active relaxation may be more appealing for people who find it easier to concentrate while physically active. The passive relaxation may be preferred by others who might find the active physical involvement aggravating. Please try them both (listening to the tape) and find out if you have any preference. Then practice either one of them or both twice a day.

Some people try too hard to relax. This is like forcing yourself to fall asleep. It doesn't work! You have to be patient with yourself and just "let it happen." Repetition and practice are the keys to your success. The more you practice your relaxation, the better and faster it will work for you. Here are a few tricks that you can use to avoid interruptions during your daily relaxation sessions:

- for best results, set aside specific time periods daily for practice
- choose a quiet place. That means no radio, television, or other such distractions
- take the phone off the hook
- inform those around you that you are not to be disturbed for at least 20 minutes
- many people begin to relax only to find themselves worrying about something that has happened or a chore that should be done immediately

(a) you can tune out such thoughts by gently pushing them aside and replacing them with self-instructions such as, "I'll think about that later," or

(b) you can write out all the "things to do" and troubling thoughts before you start your relaxation routine and then place the piece of paper out of sight. Since you have already noted them, you won't have to worry about forgetting them and you can concentrate on relaxation.

You might feel guilty about taking time off to relax. You might even consider it "goofing off." You should dispense with this idea immediately. You are not being lazy! You need these relaxation periods. You are following a carefully devised self-help program when you practice relaxation twice daily. This

time is not wasted! If you wish, you may think of the time as being spent reprogramming your body to a good health habit, much like programming a computer.

Continue to practice relaxation while listening to the tape until you can play the sequence back in your mind just by closing your eyes and concentrating. Remember, the tape cannot make you relax; it is a guide only. It is you that are relaxing yourself. Once relaxation becomes a habit, you will be able to relax yourself at will—quickly and easily, without the tape—anywhere, anytime, anyplace.

APPENDIX R

PROGRESSIVE ACTIVE MUSCLE RELAXATION

Make yourself as comfortable as you can, sitting in a comfortable chair with your feet flat on the floor. Be sure the chair offers good support for your back. You can rest your arms on your lap or on the arms of the chair, or you may find it helpful to place a bed pillow on your lap and rest your arms on it. If you wear glasses, please remove them. Now, close your eyes and allow yourself to begin to relax. Turn your attention to what your body is feeling at the moment. Just scan your body from the very top of your head down to your toes and see how your body is feeling.

Start by taking a very deep breath through your nose. Slowly fill your lungs with fresh air and hold it for a few seconds. Now, part your lips slightly and very slowly let the air out through your mouth. Imagine that you are gently blowing across the top of a spoon of hot soup. Again ... in through your nose, down to the very bottom of your lungs ... filling them up. Hold it briefly and let it out very, very slowly and completely through your mouth. Take two more deep breaths.... Slowly inhale through your nose until your lungs are full of fresh air. Hold this air in your lungs for a couple of seconds ... and then exhale slowly through your mouth, feeling pleasant warmth gradually spreading across your chest as you begin to relax. And again, in ... and out.

Now continue breathing evenly and steadily. Spend about the same amount of time on getting the air in as you are on letting it out. Notice that as you breathe in, your chest rises; and as you let it out, your shoulders drop and that the whole of your chest and midriff relaxes.

You will now learn ways of relaxing the muscles in your body from the bottom of your feet all the way up to your head. On each occasion, I will ask you to tighten the muscles <u>slightly</u> prior to relaxing them fully. Concentrate on getting the contrast between the tensed and relaxed states. In each case, I just want you to see if you can feel the difference between the muscle as you tense and as you begin to relax. Do not tense any more than you need to get the comparison. Tighten the muscle on an in-breath. Relax the muscle as you exhale. Use the out-breath to increase the relaxation in the muscles as we gradually work through the body.

Let's start off with your feet and your legs. Put your feet flat on the floor, take a deep breath, raise your heels off the ground, and push your toes down onto the floor. That's right, toes pressing down and heels up ... and now relax your legs completely. Feel the difference in the muscles that you have just tensed as they start to relax. Allow the tension you have just created to drain out of your muscles as if it were water. Feel it down your shins to your very toes, relaxing further and further.

Let's do that one again. Remember to tighten your muscles only slightly. Take a deep breath, raise your heels up, and press your toes down firmly. Now, breathe out and let your legs relax completely. Feel the tension flowing away as you relax.

For the next exercise, keep your heels down and pull your toes up toward your shins. Now take a deep breath, press your heels down firmly onto the ground, pull your toes up ... and now relax your muscles as you breathe out. Feel the tension draining away from the muscles of your legs ... your feet ... and your toes. And as you continue to breathe slowly, evenly, and steadily, use every out-breath to consciously relax your muscles a bit more. In through your nose and out through your mouth.

Next, you can relax the muscles in your thighs and buttocks. Sit straight against the back of your chair. Keep your stomach in, feet on the ground. Now take a deep breath, pull your toes up toward you, and tighten your buttocks ... hold it ... and let it go on the out-breath. Let your buttocks relax completely.... Remember to use every out-breath to increase the relaxation in these muscles further and further ... and as you keep on breathing evenly and steadily, notice how the whole lower portion of your body, from your waist down to your thighs ... legs ... and feet feel very heavy. Heavy, warm, and relaxed.... See if you can maintain that heavy, warm feeling in the lower part of your body while we work on the other muscles.

Now, think of your stomach muscles. Inhale deeply and tighten your stomach muscles, hold it for awhile, and let it go on the out-breath. And as you relax your stomach area, imagine the muscles feeling heavy and completely without any tension.... Keep on breathing evenly and steadily and concentrate on your arms. Now as you breathe in, pull your hands toward your shoulders ... make tight fists ... hold it ... and now let go. Feel the tension flowing down your arms....

Feel the muscles become warm and relaxed, and let your fingers relax too.

Next, shrug your shoulders or pull your head down by shortening your neck muscles and lift your shoulders up to your ears. Okay, breathe in as you pull your head down and lift your shoulders. Hold it ... and now let the muscles relax on the out-breath. Feel the tension flowing away as if it were water and it could flow down your arms and out your fingertips. And as you keep breathing evenly and steadily, with each out-breath continue to reduce tension and discomfort further and further.... Concentrate now on the muscles at the back of your neck. While you inhale, bring your head down almost to your chest. Hold it ... now relax and on the out-breath let your head come back to its natural resting position. Feel the tension that you created flowing away from you as the muscles become more and more relaxed.... Keep breathing evenly and steadily, feeling heavy and warm, but very alert to what you are doing.

Now, I want you to notice the tension in your jaw. As you breathe in, clench your teeth and pull back your mouth to a big smile. Hold it ... and now let it go with an out-breath. Notice the feeling in the muscles as you relax. Feel the muscles loosening up and relaxing more and more deeply. You can increase this relaxation by letting your jaw hang slightly open and by letting your tongue settle comfortably in your mouth. Feel how your mouth is becoming completely relaxed without any tension.

Now think about the muscles in your face—all the many little muscles that control your expressions during the day. Take a deep breath and lift your eyebrows just as high as you can.... Hold it ... feel the tension ... and relax. Let it go with the out-breath. Feel your eyebrows and your forehead smoothing out. Let go of all the little muscles around your eyes ... forehead ... temples ... and scalp.... And now I want you to take a deep breath and squint your eyes tightly, right from your jaw. Hold it ... and now let it go. Breathe away all the tension. Allow your jaw to hang loose and let your tongue rest comfortably in your mouth, really concentrating on letting go of all the tension that you have created in your face. Very good.

And as you breathe slowly and evenly, just in and out, you can scan your body from the bottom of your feet all the way up to your head. As I say each muscle group, check to see if it is relaxed or if there is some remaining tension. With each out-breath, see if you can let go a little bit more.

First concentrate on your feet ... ankles ... shins ... knees ... legs.... Let them relax further and further, feeling heavy, warm, and loose.... Just keep breathing evenly and steadily ... in ... and ... out ... smoothing away any tension in the lower part of your body.

Next, think about your buttocks ... stomach ... midriff ... breathing away the tension ... and relaxing further and further.

Now notice your chest ... upper arms ... lower arms ... fingers.... Allow them to relax even more and let go of any tension you may be holding. Just let it go as you breathe out, relaxing further and further ... feeling the rise and fall of your chest with your breathing in and out.

Next, notice the muscles in your face ... head ... neck ... and shoulders.... Concentrate on letting them relax further and further ... breathing slowly in and out.

Now allow your imagination to drift away to your favorite outdoor scene. This is a favorite place of yours. You are there by yourself on a warm, calm, and peaceful day. The sky above you is blue, and the grass around you is green. Take a moment and find a comfortable place to lie down in the fresh, soft, green grass. Let yourself feel the soothing, penetrating warmth of the sun. Feel the gentle breeze stroking your face softly. Enjoy the beauty of the very clear blue sky with fluffy little white clouds drifting lazily by. Listen to the pleasant, natural sounds of the breeze whispering through the leaves of the trees that surround you. Tell yourself that your mind and body feel peaceful, comfortable, relaxed, and perfectly at ease. Think about those words "relaxed" ... "peaceful" ... "calm" ... and "comfortable." If any other thoughts pop into your mind, just gently push them aside ... breathing evenly and steadily.... Just appreciate the calmness spreading to every part of your body and easing you deeper into a dream-like state of complete relaxation.... You feel very safe and secure in this private, special place.... Now you may go there anytime just by taking four deep breaths ... and when you reach the fourth breath, you will be as relaxed as you are right now. And every time you practice this exercise, you will get better and better at it and relaxation will come more and more easily....

Now as you continue to breathe slowly and evenly, I'm going to count very slowly back from five to one. And as I count, you can rouse yourself gently and slowly. You are not in a hurry. As I count, bring yourself very slowly and quietly

back. Just follow my suggestion. When I reach one, you will be wide awake, completely alert ... feeling very good. "5": move your feet and toes a little bit. Wiggle your toes and extend the movement further up to your knees and your thighs.... "4": move your hands and your fingers slowly. Start to get them active again.... "3": move yourself a little bit in your chair.... "2": move your head and neck, stretch, yawn if you wish.... And "1": slowly open your eyes, feeling quite calm and relaxed, very pleasantly relaxed, just as if you had had a very nice nap.... Now take a deep, full breath and stretch. Everything is fine. Just let the feelings of calmness and relaxation carry over with you as you become wide awake.

APPENDIX S

PROGRESSIVE PASSIVE MUSCLE RELAXATION

Make yourself as comfortable as you can, sitting in a comfortable chair with both your feet flat on the floor. Be sure the chair offers good support for your back. You can rest your arms on your lap or on the arms of the chair, or you may find it helpful to place a bed pillow on your lap and rest your arms on it. If you wear glasses, please remove them. If you prefer, you may lie down. Now, close your eyes and allow yourself to begin to relax.

Start by taking a very deep breath through your nose. Slowly fill your lungs with fresh air and hold it for a few seconds. Now, part your lips slightly and very slowly let the air out through your mouth. Imagine that you are gently blowing across the top of a spoon of hot soup. Again, in through your nose, down to the very bottom of your lungs ... filling them up. Hold it briefly and let it out very, very slowly and completely through your mouth. Take two more deep breaths ... slowly inhale through your nose until your lungs are full of fresh air. Hold this air in your lungs for a couple of seconds ... and then exhale slowly through your mouth, feeling pleasant warmth gradually spreading across your chest as you begin to relax. And again, in ... and out.

Now continue breathing evenly and steadily. Spend about the same amount of time on getting the air in as you are on letting it out. Notice that as you breathe in, your chest rises; and as you let it out, your shoulders drop and that the whole of your chest and midriff is relaxed.

You will now learn ways of relaxing the muscles in your body from the bottom of your feet all the way to your head.

First, it's important that we understand the difference between relaxation and tension. We all know what it's like to be tense ... but sometimes we forget what it's like to be relaxed.... So to compare the two, I'd like you to tighten your hands into fists ... just as tight as you can ... and notice the sensation in your hands ... wrists ... and forearms.... Feel the tightness in your knuckles.... Feel the shaking in your wrists ... and the tightness in your forearms.... That's tension.

Now gradually release your hands ... letting them relax more and more, letting all the tension flow out of your hands and your wrists and your forearms....

Let your hands become completely relaxed.... That sensation that you feel in your wrists ... in your forearms ... in your hands ... and fingers ... is what we will define as relaxation.

Let's tighten up once more.... Make your fists. Tighten them up really tight ... and notice the tension in your forearms. Feel the tension of your muscles, your fingernails biting into your hands, the tension in your fingers ... and now let them relax.... Let your hands relax ... and your wrists relax ... and your forearms relax.... Let all the muscles in your lower arms and hands completely relax.... Just let go ... and let the pleasant feelings of relaxation ... spread through your forearms ... hands ... and fingers.... Enjoy that warm ... heavy feeling as those muscles relax more and more as we concentrate on other parts of your body.... Remember, your breathing is even ... and steady.

Think about your upper arms and let those muscles relax from your elbows up to your shoulders.... Let them relax.... Just let them go, feeling warm and heavy ... becoming more relaxed and more relaxed.

Now think about your upper back, from your shoulders across to your shoulder blades, from one shoulder across to the other and back again. And let all those muscles in your upper back relax.... Just turn each tension off. Let each muscle relax completely.... As you let go ... let all the muscles in your upper back ... relax.

Think about your upper chest ... from one shoulder across under your throat and back up to the other shoulder ... and let all those muscles relax.... Just let them go ... becoming more relaxed and more relaxed as all the muscles in your upper chest ... relax.

And as you continue to breathe evenly, think about your upper stomach ... and let all those muscles relax. From your tummy around your waist to your backbone and back again, letting all the muscles in your upper abdomen become more relaxed and more relaxed.... Just let them go ... turning off each muscle and letting it relax even more ... so that all the muscles in your upper abdomen are completely relaxed.

Think about your lower stomach and let all those muscles go ... from your lower stomach around to your hips and across to your lower back and back again.... Let all of those muscles relax.... Let them feel loose and easy ... as you let all

the muscles in your lower abdomen completely relax.... Just let them go, becoming more relaxed and more relaxed ... and even more relaxed.

Now think about your thighs, from your hips to your knees.... And let all the muscles in your thighs relax ... along the tops of your thighs ... along the bottoms of your thighs ... letting all the muscles relax.... Just let all the muscles in your thighs become completely loose ... and heavy ... and let them relax.

Think about your lower legs and let those muscles relax ... from your knees down to your ankles, all the muscles in your lower legs.... Feel the warmth.... Let your calves relax.... Let the muscles along the sides of your shinbones relax ... so that all the muscles in your lower legs are even more relaxed.

Think about your ankles and feet and let them relax.... Let the relaxation spread down the backs of your heels and out along the soles of your feet, to your arches, to the balls of your feet, right out to the tips of your toes.... Let all of the bottoms of your feet relax.... Now let the relaxation spread down the tops of your feet, from the forward part of your ankles, out across the tops of your feet, to your toes again ... so that your ankles and feet are completely relaxed.... Just let them go, becoming warm and heavy ... enjoying the pleasant feelings of relaxation.

Let the relaxation move up your spine from your tailbone, up each vertebra, becoming more and more relaxed ... right up to your neck, to the base of your skull.... Continue relaxing the muscles of your back so that it is completely free of tension.

Think about your neck.... Let all the muscles in your neck relax ... from your chin ... down to your throat ... to your chest ... from your ears to your shoulders ... from the base of your head down to your back.... Concentrate on this area around the neck and let it completely relax.

Let all the muscles in your throat relax ... becoming more relaxed ... and more relaxed.... Think about your face ... and let it relax.

Concentrate on your lower jaw from one ear, down to your chin, and up to your other ear. Let all the muscles of your lower jaw relax.... Just let them go and feel them relax.

Think about your lips ... and your tongue ... and let them relax ... so that all the muscles around your lips and your tongue are loose and easy ... as you let them relax.... Go now to your cheeks ... from one cheek, up across your nose,

and down the other side, to the other cheek, and let that area of your face relax ... so that your face is becoming very relaxed, feeling very loose and free of all tension.

Think about your forehead and let all the muscles in your forehead relax ... from your eyebrows right up to your hairline.... Let all those muscles relax ... so that your forehead becomes more relaxed and more relaxed.... Just let it go, and relax.

Think about your eyes and let all the muscles around your eyes relax.... Let your eyelids relax ... so that all the area around your eyes is becoming more relaxed, and more relaxed.... Let that relaxation spread up over your forehead, through your scalp, and back down to the back of your neck ... with your whole head becoming completely relaxed.... Concentrate on relaxing, searching out any tensions in your muscles and letting them go ... becoming even more relaxed.

Now I'd like you to imagine some other place, at another time.... It is summer.... Think back ... to some special place where you once were, maybe as a child, or some other time, a place where you could go be alone and relax and feel safe.... Find that place in your memories and go there now.... It's a nice day ... soft breeze ... the sky above you is blue and the sun is warm.... It's good to be alive.... Just let yourself go ... and relax even more.... Let yourself feel the soothing, penetrating warmth of the sun on this perfect day and feel the gentle breeze stroking your face softly ... feeling safe, and secure, and so very good.... Just relax ... so very relaxed ... more relaxed maybe than you've ever been ... so very relaxed.... Enjoy these pleasant feelings ... of relaxation ... and tranquility and you feel very calm, safe, and secure in this very private, special place. Now you may go there anytime just by taking four deep breaths ... and when you reach the fourth breath, you will be as relaxed as you are right now. And every time you practice this exercise, you will get better and better at it, and relaxation will come more and more easily.

Now as you continue to breathe slowly and evenly, I'm going to count very slowly back from five to one. And as I count you may choose to rouse yourself gently and slowly moving as suggested, or you may choose to fall into a restful sleep, letting each number take you deeper and deeper. In either case you are not in a hurry. As I count, bring yourself very slowly and quietly back, or allow yourself to drift into a peaceful sleep. Just follow my suggestion. When I reach

one, you will either be wide awake, completely alert, or deeply asleep ... feeling very good.... "5": if you are waking, move your feet and toes a little bit. Wiggle your toes and extend the movement further up to your knees and your thighs.... If you are coasting into sleep, just allow yourself to drift deeper with each number. "4": move your hands and your fingers slowly. Start to get them active again.... "3": move yourself a little bit in your chair or feel the heaviness and warmth as you sink into a deep sleep.... "2": move your head and neck, stretch, yawn if you wish ... and "1": either now or upon awakening slowly open your eyes, feeling quite calm and relaxed, very pleasantly relaxed, just as if you had had a very nice nap.... Now take a deep, full breath and stretch. Everything is fine. Just let the feelings of calmness and relaxation carry over with you as you become wide awake.

APPENDIX T

WEEKLY RELAXATION CHART

NAME _____

Learning to relax requires practice. Listen to the relaxation tape twice a day for maximum benefits. On the chart below, register every day at what time you practice and how relaxed you were before and after each practice. To rate your degree of relaxation, use a number from 0 to 100. The higher the number, the more relaxed you felt. The number 0 indicates that you were not relaxed at all, and the number 100 indicates that you were totally relaxed. Remember, you can use any number between 0 and 100.

		Degree of Relaxation		
Date	Time	Before	After	Comments

APPENDIX U

SESSION #4: ATTENTION DIVERSION

One of the consequences of a chronic pain problem is the tendency for sufferers to focus increasingly upon the pain sensation and its intensity and spread. Unfortunately, the more they focus on the pain the worse pain they feel. A good example is when you are lying awake at night and there is nothing in the dark bedroom to attract your attention other than the nagging pain you feel. The pain appears to mount and mount and become unbearable. The less you focus on pain, the less pain you will feel. Of course that's easier said than done. But it can be done.

Let's illustrate why your attention is so important and how it can be controlled. Our attention is naturally drawn to things inside or outside ourselves that are most obvious at the moment. For example if there is a sudden loud noise, bright light, or vivid color in the room, you are almost certain to pay attention to it. In the same way that you tend to focus on this kind of outside stimulus, you are strongly drawn to attend to painful sensations.

Our awareness and attention act like a spotlight which lights up and accentuates whatever we focus upon. Things on which we focus our attention are pretty clear. By contrast, all other things outside the circle of light are in the dark—unclear and distant and tend momentarily to fade out of awareness. For example, sit back in your chair, close your eyes, and just take a few moments to relax. .... Now, become aware of the sensations in your thighs as you sit in your chair. These sensations are very real and they have a physical basis, but they are not normally experienced because other things usually occupy your attention. Compare this with a TV set. Now, you can block out the channel 2 signal by tuning in channel 4. The channel 2 signal is still there but is not tuned in. The same with your pain: while your pain signals are undoubtedly real, you can learn to "tune them out" by controlling the direction of your attention's spotlight.

Now, close your eyes again and direct your attention to your own breathing .... the sounds, the rhythm, the movement of your chest and stomach. .... As you focus on your breathing, you are most likely unaware of the sensations in your hands. .... And now, as you think about your hands, your attention probably moves there and you become aware of the sensations in your hands. But now

the awareness of your breathing has probably faded away. So as you can see, your awareness can shift from one thing to another, quite rapidly, but you can be fully aware only of whatever is the focus of your attention at the moment.

Let's try another little exercise. Close your eyes again and become aware of the thoughts or images that come to your mind. .... Pay attention to these thoughts. .... And now try to stop them. Try really hard. You will notice that it is not easy to stop them and think about nothing at all. As you probably have experienced before, telling yourself "Don't think about it" often does not help unless you intentionally think about something else. You can probably recall some time trying to "Think about something else" in order to get rid of an unwanted thought or feeling. Thinking about something else is easier than trying to just stop thinking about the unpleasant thing.

Talking about, thinking about, complaining about, ruminating about, and worrying about pain—all act to focus attention on pain which opens the "gate" and as a result maximizes the pain sensation. On the other hand, distraction and diverting attention away from the pain is one of the most potent ways to partially close the "gate" and minimize the pain sensation experienced. The reason is very simple. You cannot focus your attention completely on more than one thing at a time. If you consciously direct your attention to something (e.g. mental activity), then you cannot attend fully to anything else (e.g. pain).

Although you may already do some things to divert your attention from the pain, it will probably be helpful to outline how other pain patients shift the spotlight away from their pain and thus reduce its intensity. Then you will be able to pick and choose from a wider assortment and find out the ones that work best for you.

1. Cut Down on "Pain Talks"

Most chronic pain patients, in talking to other people, find themselves continually bringing up the issue that is so much on their minds—their pain and their disabilities. Your first important step in controlling your pain is to try to break your habit of drawing your own attention to it. Discussing your pain with other people merely reminds you of the difficulties and focuses your attention on the sensations. The best help your spouse or friends can be to you is (i) to distract you and shift your focus from the pain to events outside yourself, or

(ii) praise and encourage you for any attempts you are making to cope with the pain and with increasing your activity.

2. Focusing Attention Outside Yourself

To occupy your thoughts with something other than unpleasant stimulation, you can attend carefully to the physical or outside environment stimuli such as sounds, sights, images, and colors. You can engage in such activities as counting floor or ceiling tiles, examining the construction of a piece of furniture in the room, carefully examining a garment you are wearing, reading a book, or watching TV.

3. Focusing on Mental Activities

You can engage in mental activities such as making a list of things to do before the weekend; remembering or singing the words to a song, a prayer, or a hymn; or engaging yourself in mental arithmetic such as counting backwards from 100 by deducting 7 each time.

4. Focusing on Sensations in Your Body

Analyze the sensation you experience in one part of your body and compare it to another part, as if you were preparing to write a medical or biological report; or compare the present sensation to feelings you have experienced before. It is no longer simply pain. Here you allow yourself to experience discomfort for "scientific" interest. You are more "objective" about the unpleasant feelings because you are not so much experiencing the sensations as observing them.

5. Minimizing or Denying the Extent of the Pain

This technique is one in which you tell yourself that you are, in fact, not in pain, that you do not hurt, and that it is not worth focusing on. You might describe what you are feeling as mild discomfort, but refrain from considering the sensation as pain.

6. Limiting the Pain

Another interesting technique is the idea of clarifying for yourself the limits of your pain problem. After pain has persisted for some time, it leaves the impression that it is all through the body or in a much wider area than in fact it is. Turn your attention to the pain, and see if you can clarify exactly for yourself the limits of the sensation: what part of the body and to what depth. Define it for yourself; and in so doing, define the parts of your body which are

entirely free from pain. Some people find this a useful approach which makes them realize that their pain is limited and therefore may be circumscribed.

7. Relocating the Pain

This strategy can be used in combination with limiting the pain or on its own. In this case, the aim is to try to re-locate the pain from its present location to some non-pain site. It takes a great deal of concentration to try to shift pain, especially if it is highly localized. It demands even more attention by attempting to move it to a further distance (from the lower back to the right ear, for example). Very often it is impossible to achieve, but the attention involved in trying to do so can act as a palliative.

8. Relocating Your Thoughts to a Non-Pain Site

Try to relocate your concentration to a non-pain site, and try to centre yourself strictly on that site. Choose a site which is entirely pain free and fix your entire focus of attention upon it, trying to shift yourself to it. For example, you might try to imagine yourself as centered and thinking from your right big toe. This technique takes considerable attention and focusing but has been reported by a number of people to be a very useful method of managing pain.

The controlling attention kinds of techniques are not easy to master and they require a good deal of concentration, practice, and discipline. They won't necessarily bring about immediate and complete relief of pain but they have a proven effect in lowering the pain levels for periods of time. They allow you to regain some control over the pain by utilizing your own resources; you become an active coper rather than a passive victim. Just hold any skepticism and keep an open mind. Keep trying and practicing until you find out what works best for you. It is best to explore the different techniques at different levels of pain, starting out exploring this power against a very low level of pain and then trying it against higher levels as you become more skilled.

APPENDIX V

SESSION #5: IMAGERY

One of the most commonly used strategies of diverting attention from an unpleasant sensation is imagining. If you focus your attention in some detail on images, you tend to notice the pain less, it will bother you less, and you will feel more in control over your pain experiences. As you recall from the previous session, you can focus your attention fully on only one thing at a time, and you can choose what you will focus upon.

Imagery usually involves visualizing and focusing on events or places that are completely absorbing. The image may be a picture in your mind, but it can also include the other senses, like hearing (perhaps music or surf), smell (salt air, flowers), touching (a gentle breeze stroking your forehead) or tasting (refreshing cool drink). In fact the more senses you can call into play, the more vivid and absorbing the images will be. One highly successful technique is to replay familiar scenes in your life that you have found very pleasant and enjoyable, particularly events that took place before your chronic pain problem began. Some people prefer to return to scenes from their childhood, when life was simple, happy, and pain-free. These scenes often have warm, emotional associations that make them very absorbing. It doesn't matter where or how far back you go as along as the scenes are removed from the here and now.

The particular image that you use in coping with a painful situation is not the most important thing. More important is that you be involved in the image so that you have little attention left to pay to the discomfort. It does take practice to develop imagery skills, but everyone has the potential to imagine a vivid scene given the right subject matter. Like any other skill, it will come more easily with time, usage, and repetition. Remember to always start imagery in conjunction with relaxation.

Let's illustrate some popular imagery techniques:

1. <u>Pleasant Images</u>

Start off closing your eyes and relaxing yourself. Now, think of a place you would most like to be. For many people, that place is an ocean beach, mountaintop, lakeside, or some other outdoor retreat. The scene need not be one where you have been before; it can be from a movie, painting, or from a fairy

tale's perfect world. Concentrate on feelings and sensations that please you the most.

For example, if you are a beach lover, you can imagine yourself lying on a beautiful beach, by a blue, picturesque lagoon, soaking up the warm, gentle rays of the sun. The sand is white and clean and its warmth soothes your body, making you feel at peace with yourself and the world. The temperature and humidity are just where you want them, so you feel neither too hot nor too cold. You hear the rhythmic lapping of waves on the shore and the gentle rustling of palm leaves. You smell the invigorating fresh sea air. Somewhere in the distance is the faint sound of pleasing music. .... Just concentrate on the scene; bring to life as many details and sensations as you can, as if you were there.

2. Secret Room

Imagine that you're walking along a corridor. You keep walking until you come to a door. It's a door you have never seen before. Behind it lies your secret room, your sanctuary, a place incompatible with any pain. You open the door, enter, and close it behind you, leaving your pain and discomfort outside to be taken away while you enjoy this place of peace and perfect tranquility.

3. Dial a Number

Imagine your pain as a number on a guage. You are in charge, and you can gradually reduce the numbers (and the pain intensity) from high to low by turning a knob which is easily accessible to you.

4. Close the Gate

Imagine the "pain gate" in your spinal cord and see yourself actually closing the gate and blocking all the pain signals from passing.

5. Colors

Let's say that you have a very painful shoulder. Concentrate on that area and imagine the sore spot as being a bright, glaring red. Now imagine that the color is gradually changing, as a rainbow does, to dull red, then orange, yellow, green, and finally blue. As the color becomes progressively cooler, the painful area also "cools down" and the discomfort decreases. When that color has turned to its coolest shade, the pain will be insignificant.

6. Moving Out

Let's use the example of a painful shoulder again. While concentrating on that area of your body, imagine that pain slowly spreading from your shoulder

down into your upper arm. Once you have this established, move the pain again, this time into your forearm. Repeat the process until you have the pain firmly trapped in your fingers. Now, imagine the pain slowly seeping out of the tips of your fingers and into thin air. Now you feel it, now you don't. You have eliminated the pain from your body.

7. Anaesthesia

Try to visualize that part of your body which is in pain as becoming numb and anaesthetized, as if it had just received an injection of novocaine. As the novocaine sets in, you feel an increasing numbness and the painful sensation fades out, mutes, and becomes less and less distinct until you become insensitive to pain in this area.

8. Shrinking

Focus on the part of your body where the pain is the most intense. Visualize a red line around the area and concentrate on the shape of this marked area. Now imagine how this area of intense pain is gradually and slowly shrinking in size. Many patients find that pain intensity declines dramatically as the size of the pain area decreases.

9. In Focus

Instead of departing from the here and now, in this technique you are actually going to concentrate on your pain so that you can take steps to reduce it. For example, let us replay an episode when your painful back muscles were very tense, perhaps even in spasm. Now, concentrate on those muscles and imagine them tied tightly in knots. Focus on the end of one muscle and then begin untying the knot at that point until the entire muscle is unravelled. Repeat the procedure until you feel that all the muscles in the area have been unknotted. You will know when you have succeeded by the fact that your pain has lessened and the area feels less tense.

10. Change of Context

Here you can use an image that actually involves the feeling of an unpleasant sensation but in a far different context. For example, one patient reported that when he experienced his pain, he imagined himself as James Bond, Special Agent 007, and that he had been shot (in the painful area) and was being chased by some counteragents. He was fleeing from them in his car down an incredibly dangerous, winding mountain road and was concentrating intensely on controlling the speeding

car. Under these circumstances, the pain from the imagined bullet was the least of his worries; although it was still there, it faded into the background.

Try to practice the different techniques. Even better, derive your own imaginative transformation of pain which suits your style, your way of life, and your experience. There is no limit to what you can include in your imagery—food, eating, dancing, arguing, sex, running, skydiving, skiing, anything that occupies your attention. Experiment and with the experimentation you can discard those things that don't work and switch to things that are more effective for you.

Sometimes you may find that you can maintain one very detailed or involved image for a long time, and at other times you may jump around from one image to another and back again constantly. Or, you may find images merging and blending into one another. That's OK. You don't have to feel "locked in" to any one image. Just be patient with yourself and keep practicing.

APPENDIX W

SESSION #6: SELF-TALK

We all talk to ourselves constantly. Although we may not think of it as such, we all have an inner voice that expresses our thoughts, influences our attitudes, and directs our activities.

A vital aspect of your coping strategies is monitoring and changing your negative, helpless self-talk to a positive and self-controlled one. What you say to yourself about your pain can make it better or worse.

The major problem in changing self-talk patterns is that people are usually unaware that they have them in the first place. Typically, chronic pain patients have a number of catch phrases which they run over and over in their heads. Here are a few examples:

- "Why me?"
- "Why can't the doctors help me?"
- "What is really wrong with me? I must have some horrible disease and no one is telling me what the score is."
- "I must be going crazy."
- "I can't take it any more. It's killing me."
- "What will people think of me now?"

You have to learn to listen to your continuous monologue and identify the catch phrases that may magnify your suffering. Stop them and replace them with positive ones.

A. <u>How to Change</u>

1. <u>Identify your negative self-talk</u>: (i) write your self-talk down: listen carefully to what is going on in your head and write it down. This is not a particularly easy task, because your self-talk patterns are often irregular and unclear. It also takes a lot of discipline and motivation when you are under pain to force yourself to write down your self-talk. But it is essential to record this first if the negative messages are to be eliminated. (ii) review: a good way of making the most of writing down your self-talk is to look back the next day at what you have written. It is easier to be objective after a period of time. You may also be somewhat surprised by what you see. A typical reaction of pain patients when they read their notes some time after they were recorded is, "Did I really

say all those negative things to myself yesterday? No wonder I felt lousier as the day went on."

2. Stop

To stop your negative self-talking, give yourself a very sharp command. You can use commands such as "Stop! I don't want to hear that anymore" or "That's nonsense! You know better than that." These will startle you out of your negativity and allow you to take better control of your thoughts and self-talk. Remember, you can make up phrases that are the most effective for you to break any repetitive, destructive thinking.

3. Replace

Replacing negative self-talk with positive self-talk is the most vital step. It is not sufficient merely to stop negative self-talk. The resulting void must be filled by positive self-talk that tells you how to react positively and effectively to any pain episodes. Listen carefully to every negative self-talk statement and immediately and deliberately replace it with a positive message. It takes a lot of practice before your new, positive self-talk becomes automatic. And it pays off.

B. Special Issues

1. Before and after comparison

Chronic pain sufferers often compare their present condition to the time before the accident, injury, or the onset of pain when all was well. Patients frequently make self-statements such as:

- "If only I hadn't had that accident, I would never have wound up like this. Before I got hurt I was perfectly healthy and pain free. But not now. I'm never going to get better."
- "Why can't I be the way I was before I was hurt?"

This type of before-and-after comparison is futile as well as depressing, because the past cannot be changed. The clock cannot be turned back. This is destructive self-talk. What is more constructive for you is to compare how you feel on a week-to-week basis. Think about how you felt a few weeks ago, how it compares with your present state, and how you will feel in the future. So for example if you say to yourself, "Why can't I be the way I was before I had this pain. I'm never going to get better," immediately stop and replace this

with something such as "No! Not true! I'm better this week than I was last week, and I'll feel even better next week."

2. Realistic expectation

It would be unreasonable to expect the total elimination of pain in severe situations. You know that when you feel some intense pain it is only realistic to expect some discomfort. But at the same time, you do not want to magnify the intensity of the sensation—just keep it manageable. Here are some examples of the sort of positive and factual things that you might say to yourself:

- "I won't try to get rid of all the pain. I just need to keep it manageable and under control."
- "I'm hurting, but instead of letting the pain push me around I'm going to try to reduce its effects."
- "I won't get overwhelmed. I'll just take one step at a time. I can handle it."

Change the wording and details to suit yourself.

3. Critical moments

During painful situations, there are times when you find the pain particularly unbearable. At such critical moments, you are prone to negative thoughts and defeating self-talk which worsen the pain sensation. At such times, you may feel overwhelming despair and are ready to give up. Even the best "coper" can break down into negative self-talk such as "I can't go on" or "I can't cope anymore. What's the use?" under these conditions.

Since negative self-statements can actually worsen your condition, you need to recognize these critical moments whenever they occur. During this time, you must actively and intentionally direct your thoughts and self-instruction to coping techniques.

Examples of the sort of positive, helpful things that you can say to yourself in critical moments are:

- "Things are going pretty bad. I can't take it anymore. No, wait! I shouldn't make things worse. Let's see what technique I can switch to."
- "My pain is terrible. Things are falling apart. Stop! stop that! Relax. I will focus my attention on something else. That's better. I am regaining control."
- "I just can't cope with this pain any longer. Nothing seems to work. No! wait a minute! Stop the negative thoughts. I practiced for this. Let me

use a coping strategy and I'll get over this difficult time. OK, let me relax, relax, breathe slowly and deeply. Let's reduce that pain again."

Some patients have found it useful to use a cue word or reminder to call to mind the various possible coping strategies. One such word that patients found helpful is "RADIS." It stands for Relaxation, Attention-Diversion, Imagery, Self-talk.

The following statements, and similar ones, can serve as reminders to you of ways you can cope with critical moments:

- "This pain is getting me. Wait! Remember RADIS! Relaxation, Attention-Diversion, Imagery, and Self-talk."
- "Stop this negative talk! Let me just concentrate on one of the techniques to do something positive."
- "Relax! Just breathe deeply and relax. Concentrate fully on breathing and relaxing."
- "I won't think about the pain. I will focus my attention on remembering the movie I saw last night."
- "Don't think about the pain! Think about what I have to do to close the pain gate again."
- "Relax. I am in control. I have a lot of different strategies to call upon. Just take a slow, deep breath and then focus on a coping strategy for dealing with it."

Change the wording to suit yourself and take the time to add to the list any statements that may work for you. Remember that you are not locked into any one statement and you can switch whenever you want.

C. Praise Yourself for Trying

It helps a lot to give yourself a pat on the back for having put forth the effort for trying. In thinking about how it went, consider how you handled the situation relative to past attempts or relative to how you handled your pain prior to beginning this program. Many patients focus only on how much more they have to do rather than on how far they have come. Slow and steady wins the race! Each effort, each personal experiment, each attempt to cope with the pain deserves careful reflection on what you learned, whether it worked or not and why, and most important some praise for having tried.

Some suggestions of reinforcing self-statements are:

- "I remembered to do RADIS. I'm learning how to beat the pain."
- "I'm handling my pain better. With more work, I'll be able to keep it from messing up my life so much."
- "That wasn't bad. I handled it pretty well, and I can do even better next time."
- "Good. I did it."

APPENDIX X

PROGRAM SUMMARY

Many people who develop a chronic pain problem, regardless of cause or severity, manage to cope with it very well. It does not disrupt their lives more than is unavoidable, and in time they find that their pain decreases in intensity. These people can be viewed as "active copers." They usually maintain positive attitudes about themselves and their prognosis, and they assume active responsibility in managing their pain. They search for and accept proper medical care and potentiate it with the utilization of their own internal resources.

At the other end of the spectrum are the "passive catastrophizers." They usually react in entirely negative ways to their pain. They tend to view themselves as helpless and hopeless victims. They are completely debilitated by their agony and are convinced that any relief can come only from some outside intervention.

The techniques that you were taught in this program can help you become a better, active coper and increase your control. If you can start to look at each pain episode as a challenge to be dealt with and use the active pain management techniques, you will find that as your control increases, your pain will become less intense.

In addition—and this is particularly important to those of you who have been suffering from a feeling of defeat—you will likely find that getting actively involved in handling your pain will improve your mood and outlook. All in all, it is not easy, it is not simple, and it takes much time and practice. But if you persist, you can help yourself more and in better ways than anyone else can.